APPENDIX F

Final Environmental Analysis

For
The Strategy for Achieving California's 2030 Greenhouse Gas Target

State of California

AIR RESOURCES BOARD
1001 I Street
Sacramento, CA 95814

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ACRONYMS AND ABBREVIATIONS

2011 Supplement	2011 Final Supplement to the AB 32 Scoping Plan Functional Equivalent Document
AAQS	California Air Quality Attainment Standards
AB	Assembly Bill
ADT	average daily traffic
APA	Administrative Procedures Act
APE	area of potential effect
~~ARB or Board~~	~~California Air Resources Board~~
BARCT	Best Available Retrofit Control Technology
BMPs	best management practices
CARB or Board	California Air Resources Board
CAISO	California Independent System Operator
Cal/OSHA	California Occupational Safety and Health Administration
CEQA	California Environmental Quality Act
CI	carbon intensity
CITSS	Compliance Instrument Tracking System Service
CNEL	community noise equivalent level
CO_2	carbon dioxide
CPUC	California Public Utilities Commission
CWA	Clean Water Act
dBA	A weighted decibels
DOT	Federal Department of Transportation
EA	Environmental Analysis

EIM	energy imbalance market
EIR	environmental impact report
FAA	Federal Aviation Administration
FED	Functional Equivalent Document
First Update	The First Update to the Scoping Plan
FSORs	Final Statement of Reasons
FTA	Federal Transit Administration
gCO_2e/MJ	grams of carbon dioxide equivalent per megajoule
GHG	greenhouse gas
GSE	airport ground support equipment
GTAP	Global Trade Analysis Project
GWP	global warming potential
HFCs	hydrofluorocarbons
HFO	hydrofluoro-olefins
iLUC	indirect land use change
IMO	International Maritime Organization
in/sec	inch per second
initial Scoping Plan	The first AB 32 scoping plan
ISOR	Initial Statement of Reasons
LCFS	Low Carbon Fuel Standard
LDVs	light-duty vehicles
LED	Low Emission Diesel
L_{eq}	equivalent level measurements
L_{max}	maximum sound level

MDVs	medium-duty vehicles
MMC	mine methane capture
$MMTCO_2e$	million metric tons of carbon dioxide equivalent
MPO	metropolitan planning organization
MWh	megawatt-hour
N_2O	nitrous oxide
NOAEL	no observed adverse effect level
NOx	oxides of nitrogen
NPDES	National Pollution Discharge Elimination System
NPS	nonpoint source
ODS	ozone depleting substance
OMP	Odor Management Plans
PHEVs	plug-in hybrid electric vehicles
PM	particulate matter
PPV	peak particle velocity
PRC	Public Resources Code
~~Proposed Plan~~	~~Proposed Strategy for Achieving California's 2030 Greenhouse Gas Target~~
PV	photovoltaic
RCRA	Resource Conservation and Recovery Act
RNG	renewable natural gas
ROG	reactive organic gases
RPS	Renewable Portfolio Standard
SB	Senate Bill
SAE	Society of Automotive Engineers

Scoping Plan	Proposed Strategy for Achieving California's 2030 Greenhouse Gas Target
SCS	Sustainable Communities Strategies
SLCP	short-lived climate pollutant
SMCRA	Surface Mining Control and Reclamation Act of 1977
SNAP	Significant New Alternatives Policy
State SIP Strategy	Proposed 2016 State Strategy for the State Implementation Plan
SWPPP	stormwater pollution prevention plan
SWRCB	California State Water Resources Control Board
TAC	toxic air contaminant
TCLP	Toxicity Characteristic Leaching Procedure
TCRs	Tribal Cultural Resources
TFA	trifluoroacetic acid
The Act	federal Clean Air Act
TOU	time-of-use
U.S. EPA	U.S. Environmental Protection Agency
USTs	underground storage tanks
VdB	vibration decibels
VMT	vehicle miles travelled
WDRs	Wastewater Discharge Requirements
WCI	Western Climate Initiative
ZEVs	zero emission vehicles

PREFACE

A Draft Environmental Analysis (EA) for the Proposed Strategy for Achieving California's 2030 Greenhouse Gas Target (Scoping Plan) was released on January 20, 2017 for an 80-day public review and comment period that concluded on April 10, 2017. A total of 221 comment letters were received during the public comment period, 45 of which addressed the Draft EA.

California Air Resources Board (CARB) staff made minor modifications to the EA based on responses to comments and other updates. To facilitate identifying modifications to the document, modified text is presented with ~~strike-through~~ for deletions and <u>underline</u> for additions. None of the modifications to the Scoping Plan alter any of the conclusions reached in the EA or provide new information of substantial importance relative to the EA. As a result, these minor revisions do not require recirculation of the document pursuant to the California Environmental Quality Act (CEQA) Guidelines, California Code of Regulations, title 14, section 15088.5, before consideration by the Board.

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1.0 INTRODUCTION AND BACKGROUND

A. Introduction

This Final~~Draft~~ Environmental Analysis (EA) is prepared for the California Air Resources Board's (CARB or Board) consideration of the Proposed Strategy for Achieving California's 2030 Greenhouse Gas Target (~~Proposed~~Scoping Plan). The Project Description section of this Final~~Draft~~ EA presents a summary of the proposed measures in the ~~Proposed~~Scoping Plan to provide the information necessary for environmental review under the California Environmental Quality Act (CEQA). A more detailed description of the ~~Proposed~~Scoping Plan is included in the ~~Proposed~~Scoping Plan, released December 1, 2017~~January 20, 2017~~, which is incorporated by reference.

This Final~~Draft~~ EA provides a programmatic analysis of the potential for adverse environmental impacts associated with implementation of the ~~Proposed~~Scoping Plan and describes feasible mitigation measures for identified significant impacts. The ~~Proposed~~Scoping Plan is a State-level planning document that recommends measures to reduce greenhouse gas (GHG) emissions to achieve the 2030 target, and its approval does not directly lead to any adverse impacts on the environment. However, as described in Chapter 4 of this Final~~Draft~~ EA, implementation of the recommended measures in the ~~Proposed~~Scoping Plan may indirectly lead to adverse environmental impacts as a result of reasonably foreseeable compliance responses. As discussed further throughout this document, it is expected that many of these identified potentially significant impacts can be feasibly avoided or mitigated to a less-than-significant level either when the specific measures are designed and evaluated (e.g., during the rulemaking process) or through any project-specific approval or entitlement process related to compliance responses, which typically requires a project-specific environmental review. Nonetheless, in the interest of informed decision making, this Final~~Draft~~ EA takes a conservative approach for CEQA compliance purposes. Namely, to avoid any risk of understating an impact at this early planning stage, the Final~~Draft~~ EA presents conclusions for post-mitigation significance of these indirect impacts as significant and unavoidable where there is the possibility that feasible mitigation either may not be sufficient or there is some risk it may not be implemented by third parties with the authority to approve actions undertaken as foreseeable compliance responses.

B. Background Information on California's Climate Change Scoping Plan

1. 2008 Climate Change Scoping Plan

Assembly Bill 32 (AB 32), the California Global Warming Solutions Act of 2006 (AB 32, Statutes of 2006, Chapter 488) declared that global warming poses a serious threat to the economic well-being, public health, natural resources, and environment of California and charged CARB with "monitoring and regulating sources of emissions of greenhouse gases that cause global warming to reduce emissions of greenhouse gases" (Health & Saf. Code, § 38510). AB 32 provided initial direction on creating a comprehensive multi-year program to limit California's GHG emissions to 1990 levels by 2020 and initiate the

transformations required to achieve the State's long-range climate objectives. One specific requirement of AB 32 is to prepare a "scoping plan" for achieving the maximum technologically feasible and cost-effective GHG emission reductions by 2020 (Health & Saf. Code, § 38561, subd. (a)).

The first AB 32 Scoping Plan (initial Scoping Plan), approved in 2008 and reapproved in 2011, contains a mix of recommended strategies that combine direct regulations, market-based approaches, voluntary measures, policies, and other emission-reduction programs calculated to meet the 2020 statewide GHG emission limit and initiate the transformations needed to achieve the State's long-range climate objectives.

2. First Update to the Climate Change Scoping Plan

The First Update to the Scoping Plan (First Update) was approved by the Board on May 22, 2014, and builds upon the initial Scoping Plan with new strategies and recommendations. The First Update identified opportunities to leverage existing and new funds to further drive GHG emission reductions through strategic planning and targeted low carbon investments. The First Update defined CARB's climate change priorities for the next five years, and set the groundwork to reach long-term goals set forth in Executive Orders S-3-05 and B-16-2012. The First Update highlighted California's progress toward meeting the "near-term" 2020 GHG emission reduction goals defined in the initial Scoping Plan. It also evaluated how to align the State's longer-term GHG reduction strategies with other State policy priorities for water, waste, natural resources, clean energy, transportation, and land use.

3. Purpose of the ~~Proposed~~Scoping Plan

On April 29, 2015, Governor Brown issued Executive Order B-30-15, establishing a mid-term GHG reduction target for California of 40 percent below 1990 levels by 2030. All State agencies with jurisdiction over sources of GHG emissions were directed to implement measures to achieve reductions of GHG emissions to meet the 2030 and 2050 targets. CARB was directed in Executive Order B-30-15 to update the AB 32 Scoping Plan to reflect the path to achieving the 2030 target.

On September 8, 2016, the Governor signed Senate Bill 32 (SB 32) (Pavley, Chapter 249, Statutes of 2016), which codified into statute the 2030 target in Executive Order B-30-15. The 2030 target establishes a critical mid-term target between 2020 and 2050 that helps frame the suite of policy measures, regulations, planning efforts, and investments in clean technologies and infrastructure needed to continue driving down GHG emissions.

C. Prior Environmental Analysis

This Final~~Draft~~ EA describes and evaluates the recommended measures proposed in the ~~Proposed~~Scoping Plan, which are ~~either~~ "known commitments" ~~or "additional measures"~~ to those previously approved to reach the 2020 target (see Chapter 2

[Project Description] for further details). Adopted measures and the associated environmental analysis from previous Scoping Plan documents include: the initial Scoping Plan in the CEQA Functional Equivalent Document (2008 FED), the 2011 Final Supplement to the AB 32 Scoping Plan Functional Equivalent Document (2011 Supplement), and the First Update to the Climate Change Scoping Plan Environmental Analysis (First Update EA), which are all incorporated by reference. Where applicable and still valid, information and analysis are drawn from these prior environmental documents for use in this FinalDraft EA. By assessing the potential for adverse and beneficial environmental impacts associated with both the known commitments and the additional measures identified in the ProposedScoping Plan that could be approved and implemented to further reduce GHG emissions, this FinalDraft EA serves as a comprehensive, programmatic environmental analysis of the State's recommended GHG reduction measures to reach the 2030 target. A summary of the prior environmental analyses is provided below.

1. 2008 Climate Change Scoping Plan Functional Equivalent Document

In 2008, CARB, acting as the CEQA lead agency under its certified regulatory program, prepared the 2008 FED that was included as Appendix J (Volume III) to the AB 32 Scoping Plan document. The 2008 FED analyzed the reasonably foreseeable indirect environmental impacts that could result from implementing the measures recommended in the initial Scoping Plan. The 2008 FED also included an analysis of a range of five alternatives to the initial Scoping Plan, including a "no project" alternative, a plan relying primarily on a Cap-and-Trade Program for the sectors included in a cap, a plan relying more on source-specific regulatory requirements with no cap-and-trade component, a plan relying on a carbon fee or tax, and a plan relying on variations of proposed strategies and measures. Following the public review and comment period, the initial Scoping Plan and the 2008 FED were approved in 2008.

Each recommended measure that involved regulatory action by CARB was subject to the required Administrative Procedures Act (APA) rulemaking process, which includes preparation of a Staff Report: Initial Statement of Reasons (ISOR) containing the required EA for that regulatory proposal. The ISORs and the Final Statement of Reasons (FSORs) for individual rulemaking can be found on CARB's webpage at http://www.arb.ca.gov/regact/regact.htm.

2. 2011 Supplement to 2008 FED – Alternatives Analysis

In June 2011, in response to a decision by a California trial court, CARB revisited and expanded the alternatives analysis provided in the 2008 FED. The 2011 Supplement provided an expanded analysis of the five project alternatives discussed in section V of the 2008 FED, and superseded and replaced the project alternatives section of the 2008 FED found at pages J-74 to J-90. Following a workshop and 45-day comment period, staff responded to comments received in a document entitled Response to Comments on the Supplement to the AB 32 Scoping Plan Functional Equivalent

Document. At a public hearing in August 2011, the Board considered and certified the combination of the 2011 Supplement and the prior environmental document, approved the written response to comments, and reapproved the initial Scoping Plan. Subsequently, the trial court dismissed that portion of the lawsuit because CARB had fully satisfied the court's requirements for an expanded alternatives analysis.

3. First Update to the Climate Change Scoping Plan Environmental Analysis

In 2014, CARB, acting as the CEQA lead agency under its certified regulatory program, prepared the First Update EA that was included as Appendix F of the Scoping Plan document. The First Update EA analyzed the reasonably foreseeable indirect environmental impacts that could result from implementing the measures recommended in the First Update to the Climate Change Scoping Plan. The First Update EA also included an analysis of a range of three alternatives to the First Update to the Climate Change Scoping Plan, including a "no project" alternative, a plan relying on reduced-intensity, and a plan to extend the Cap-and-Trade regulation to all economic sectors. Following the public review and comment period, staff responded to comments received on the First Update EA in a document entitled Response to Comments on the First Update to the Climate Change Scoping Plan Environmental Analysis. At a public hearing in May 2014, the Board certified the First Update EA, approved the written responses to comments, and approved the First Update to the Climate Change Scoping Plan.

Each recommended measure that involved regulatory action by CARB was subject to the required APA rulemaking process, which includes preparation of a Staff Report: ISOR containing the required EA for that regulatory proposal. The ISORs and the FSORs for individual rulemaking can be found on CARB's webpage at http://www.arb.ca.gov/regact/regact.htm.

D. Environmental Review Process

1. Requirements under the California Air Resources Board Certified Regulatory Program

CARB is the lead agency for the ~~Proposed~~Scoping Plan, and prepared this Final~~Draft~~ EA pursuant to its certified regulatory program for CEQA compliance. Public Resources Code (PRC) Section 21080.5 allows public agencies with regulatory programs to prepare a functionally-equivalent substitute document in lieu of an environmental impact report or negative declaration once the program has been certified by the Secretary for Resources as meeting the requirements of CEQA. CARB's regulatory program was certified by the Secretary for Resources in 1978 (see Cal. Code Regs., tit.14, § 15251.(d)). As required by CARB's certified regulatory program, and the policy and substantive requirements of CEQA, CARB prepared this Final~~Draft~~ EA to assess the potential for significant adverse and beneficial environmental impacts associated with the recommended actions and to provide a succinct analysis of those impacts (see Cal.

Code Regs., tit.17, § 60005(a) and (b)). The resource areas from the CEQA Guidelines (Cal. Code Regs., tit. 14, § 15000 et. seq.) Environmental Checklist (Appendix G) was used as a framework for assessing potentially significant impacts.

CARB determined that approving the ~~Proposed~~Scoping Plan is a "project," as defined by CEQA (see Cal. Code Regs., tit.14, § Section 15378(a)). The CEQA Guidelines define a "project" as "the whole of an action, which has a potential for resulting in either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment, and that is … an activity directly undertaken by any public agency."

Although the approval of policy aspects of the ~~Proposed~~Scoping Plan does not directly change the physical environment, indirect physical changes to the environment could occur from reasonably foreseeable compliance responses taken because of implementation of the measures identified in the ~~Proposed~~Scoping Plan.

2. Scope of Analysis and Assumptions

The degree of specificity required in a CEQA document corresponds to the degree of specificity inherent in the underlying activity it evaluates. The environmental analysis for broad plans will necessarily be less detailed than that for specific projects (see Cal. Code Regs., tit.14, § 15146). For example, assessing a construction project would naturally be more detailed than assessing a broad plan because the construction effects can be predicted with a greater degree of accuracy (see Cal. Code Regs., tit.14, § 15146, subd. (a)).

The level of detail in this Final~~Draft~~ EA reflects that the ~~Proposed~~Scoping Plan is a broad statewide-level planning document. Consequently, the analysis is at a programmatic level and does not provide the level of detail that would be presented in subsequent environmental documents prepared for specific regulatory actions that CARB or other agencies may decide to pursue to reduce GHGs or any analysis carried out for specific construction projects by various entities to comply with regulations or policies in the plan (Cal. Code Regs., tit. 14, § 15168). If CARB or other State agencies pursue regulations to implement any of the GHG measures discussed in the ~~Proposed~~Scoping Plan, each regulation would go through the APA process. The APA is a rigorous process that includes technical, environmental, and economic analyses, and public review and input. The ISOR prepared for each regulation or regulatory amendments proposed by CARB, also known as the Staff Report, would include a more detailed environmental analysis specific to that proposal.

This Final~~Draft~~ EA evaluates potential significant adverse impacts and beneficial impacts of the reasonably foreseeable compliance responses for implementing the ~~Proposed~~Scoping Plan, based on currently available information, without being speculative. The EA, including public comments on the Draft EA and responses to environmental points raised in public comments, will inform the Board about the environmental implications of approving the ~~Proposed~~Scoping Plan.

The analysis of potentially significant adverse environmental impacts of the ~~Proposed~~Scoping Plan is directed by the following parameters:

1. The analysis addresses the environmental impacts resulting from implementing the ~~Proposed~~Scoping Plan compared to a baseline consisting of existing conditions.

2. The analysis of environmental impacts is based on the effects of compliance responses that are reasonably foreseeable, if the measures in the ~~Proposed~~Scoping Plan are implemented.

3. The analysis in this Final~~Draft~~ EA addresses environmental impacts both within California and outside the State to the extent they are reasonably foreseeable and do not require speculation.

4. The level of detail of impact analysis is necessarily and appropriately general, because the ~~Proposed~~Scoping Plan describes a broad plan and is itself programmatic. Furthermore, it would be speculative to predict decisions by other entities regarding the specific location and design of new or modified facilities that may be undertaken to implement measures within the ~~Proposed~~Scoping Plan. Therefore, it is not possible to predict location-specific effects with precision at this stage, given the lack of specificity of the measures, the influence of other business and market considerations, and the numerous locations where facilities might be built. Specific development projects undertaken to implement recommended measures in the ~~Proposed~~Scoping Plan would undergo required project-level environmental review and compliance processes at the time they are proposed.

5. This Final~~Draft~~ EA generally does not analyze site-specific impacts when the location of future facilities or other infrastructure would be speculative. However, the Final~~Draft~~ EA does examine regional (e.g., air basin) and local (i.e., community-level) issues to the degree feasible and appropriate. Thus, the impact conclusions in the resource sections of Chapter 4, Impact Analysis and Mitigation Measures, cover broad types of impacts, considering the potential effects of the full range of reasonably foreseeable compliance actions undertaken in response to the ~~Proposed~~Scoping Plan.

E. Organization of the Environmental Analysis

This Final~~Draft~~ EA is organized into the following chapters to assist the reader in obtaining information about the ~~Proposed~~Scoping Plan and the specific environmental issues.

- Chapter 1, Introduction and Background – provides a project overview, background information, and other introductory material.

- Chapter 2, Project Description – summarizes the ~~Proposed~~Scoping Plan, implementation assumptions, and reasonably foreseeable compliance responses expected to be taken to implement the recommended measures in the ~~Proposed~~Scoping Plan.

- Chapter 3, Environmental and Regulatory Setting in combination with Attachment A – contains the environmental setting and regulatory framework relevant to the environmental analysis of the ~~Proposed~~Scoping Plan.

- Chapter 4, Impact Analysis and Mitigation – identifies the potential environmental impacts associated with the ~~Proposed~~Scoping Plan and mitigation measures for each resource impact area.

- Chapter 5, Cumulative and Growth-Inducing Impacts – identifies the cumulative effects of implementing the ~~Proposed~~Scoping Plan against a backdrop of past, present, and reasonably foreseeable future projects.

- Chapter 6, Mandatory Findings of Significance – discusses whether the ~~Proposed~~Scoping Plan has the potential to degrade the quality of the environment, cause substantial adverse impacts on human beings, and cause cumulatively considerable environmental impacts.

- Chapter 7, Alternatives Analysis – discusses a reasonable range of potentially feasible alternatives that could reduce or eliminate adverse environmental impacts associated with the ~~Proposed~~Scoping Plan.

- Chapter 8, References – identifies sources of information used in this Final ~~Draft~~ EA.

F. Public Review Process for the Environmental Analysis

CARB, in collaboration with the California Environmental Protection Agency, California State Transportation Agency, California Energy Commission, California Public Utilities Commission, California Natural Resources Agency, California Department of Food and Agriculture, and the Governor's Office of Planning and Research, co-hosted a public workshop on October 1, 2015. The State agencies shared their near- and long-term visions for the State, and provided an additional opportunity for public engagement, comments and questions. At two regional public workshops held on March 23, 2016 and April 27, 2016, CARB described plans to prepare a Draft EA for the ~~Proposed~~Scoping Plan and invited public feedback on the scope of the analysis. In addition staff also discussed the ~~Proposed~~Scoping Plan at public workshops on January 15, 2016; August 23, 2016; September 14, 2016; November 7, 2016; and December 16, 2016, and at the Board hearings held on November 19, 2015; June 23, 2016 and November 17, 2016, as well as 11 EJAC and 11 Community meetings.

In accordance with CARB's certified regulatory program, and consistent with CARB's commitment to public review and input on its proposed actions, ~~this~~the Draft EA was~~is~~ subject to a public review process through the posting of the ~~Proposed~~Scoping Plan and ~~this~~the Draft EA for a public review period that began~~begins~~ on January 20, 2017 and ~~ends~~ended on April 10, 2017~~March 6, 2017~~. While the ~~Proposed~~Scoping Plan and Draft EA were~~are~~ out for public comment, staff held~~will hold an~~ informational Board Hearings on January 27, 2017 and February 16, 2017.

After the public review period, CARB ~~will~~ prepared written responses to comments received on the Draft EA and made~~make~~ revisions, as necessary. This~~The~~ Final EA and the written responses to environmental comments will be considered by the Board at a public hearing in December 2017. If the ~~Proposed~~Scoping Plan is approved, a Notice of Decision will be posted on CARB's website and filed with the Secretary for Natural Resources. (Cal. Code Regs., tit. 17, § 60007, subd. (b).) The Notice of Decision will also be filed with the State Clearinghouse.

2.0 PROJECT DESCRIPTION

This section provides a summary of the Proposed Strategy for Achieving California's 2030 Greenhouse Gas Target (~~Proposed~~Scoping Plan) and the recommended measures for purposes of the impact analysis. Please refer to Chapter II of the ~~Proposed~~Scoping Plan for full descriptions.

A. Overview of the ~~Proposed~~Scoping Plan and Scope of the "Project" under CEQA

Assembly Bill 32 (AB 32) requires the California Air Resources Board (CARB or Board) to update the State's Scoping Plan for achieving the maximum technologically feasible and cost-effective reductions of greenhouse gas (GHG) emissions at least once every five years. (Health & Saf. Code § 38561 (h).) The Scoping Plan was first approved by the Board in 2008 and was re-approved in 2011. The First Update to the Climate Change Scoping Plan (First Update) was approved by the Board in 2014.

The First Update defined the State's GHG emission reduction priorities for the next five years and laid the groundwork to start the transition to the post-2020 goals set forth in Executive Orders S-3-05 and B-16-2012. The First Update recommended the need for a 2030 mid-term GHG reduction target to establish a continuum of action to reduce emissions. The First Update identified broad, post-2020, sector-specific actions, but did not yet define a detailed suite of recommended measures, along with estimated emission reductions, cost projections, and a schedule for adoption.

In April 2015, Governor Brown issued Executive Order B-30-15 to establish a California GHG reduction target of 40 percent below 1990 levels by 2030. In doing so, the Governor called on California to pursue a new and ambitious set of strategies, in line with the five climate change pillars from his inaugural address, to reduce GHG emissions and prepare for the unavoidable impacts of climate change. To develop a clear plan of action to achieve the State's goals, the Executive Order called on CARB to update the AB 32 Climate Change Scoping Plan to incorporate the 2030 target. In the summer of 2016, the Legislature affirmed the importance of addressing climate change through passage of Senate Bill 32 (SB 32) (Pavley, Chapter 249, Statutes of 2016), which codified into statute the 2030 reduction target of 40 percent below 1990 levels by 2030 contained in the Governor's Executive Order. The update to the AB 32 Climate Change Scoping Plan to reflect the 2030 target (2030 Target Scoping Plan Update) will serve as the framework to define the State's climate change priorities to 2030 and beyond.

Although the ~~Proposed~~Scoping Plan broadly discusses climate policy efforts underway across state government to support GHG reductions and combat climate change, the core charge to CARB leading to this ~~Proposed~~Scoping Plan was to identify measures to achieve the 2030 target. Accordingly, for the purposes of this Final~~Draft~~ Environmental Analysis (EA), CARB considers the recommended measures to achieve the 2030 target in Chapter II of the ~~Proposed~~Scoping Plan to be the "project" under the California

Environmental Quality Act (CEQA). The Final~~Draft~~ EA has determined that the reasonably foreseeable compliance responses associated with implementation of the ~~Proposed~~Scoping Plan's recommended measures in Chapter II have the potential to result in an indirect physical change in the environment.

B. Project Objectives

The primary objectives of the ~~Proposed~~Scoping Plan are listed below. These objectives are primarily derived from the requirements of SB 32 and AB 32 (Health & Saf. Code, § 38561), as well as other governing law, as well from statutory requirements applicable to and for the approval of AB 32 GHG emission reduction measures (Health & Saf. Code, § 38562).

1. To update the State's Scoping Plan for achieving the maximum technologically feasible and cost-effective reductions in GHG emissions to reflect the 2030 target (Executive Order B-30-15 and SB 32, Statutes of 2016);

2. Pursue measures that implement reduction strategies covering the State's GHG emissions in furtherance of executive and statutory direction to reduce GHG emissions to at least 40 percent below 1990 levels by 2030;

3. Increase electricity derived from renewable sources from one-third to 50 percent;

4. Double efficiency savings achieved at existing buildings and make heating fuels cleaner;

5. Reduce the release of methane and other short-lived climate pollutants;

6. Pursue emission reductions that are real, permanent, quantifiable, verifiable and enforceable;

7. Achieve the maximum technologically feasible and cost-effective reductions in GHG emissions, in furtherance of reaching the statewide GHG emissions limit (Health & Saf. Code, §38562, subd. (a) and (c));

8. Minimize, to the extent feasible, leakage of emissions outside of the State;

9. Ensure, to the extent feasible, that activities undertaken to comply with the measures do not disproportionately impact low-income communities (Health & Saf. Code, §38562, subd. (b)(2));

10. Ensure, to the extent feasible, that activities undertaken pursuant to the measures complement, and do not interfere with, efforts to achieve and maintain national and California Air Quality Attainment Standards (AAQS) and

to reduce toxic air contaminant (TAC) emissions (Health & Saf. Code, §38562, subd. (b)(4));

11. Consider overall societal benefits, including reductions in other air pollutants, diversification of energy sources, and other benefits to the economy, environment, and public health (Health & Saf. Code, §38562, subd. (b)(6));

12. Minimize, to the extent feasible, the administrative burden of implementing and complying with the measure (Health & Saf. Code, §38562, subd. (b)(7));

13. Consider, to the extent feasible, the contribution of each source or category of sources to statewide emissions of GHGs (Health Saf. Code §38562, subd. (b)(9));

14. Maximize, to the extent feasible, additional environmental and economic benefits for California, as appropriate (Health & Saf. Code, §38570, subd. (b)(3)); and

15. Ensure that electricity and natural gas providers are not required to meet duplicative or inconsistent regulatory requirements (Health & Saf. Code, §§ 38501, subd. (g), 38561, subd. (a)).

C. Summary of Proposed Measures

In this section, the Draft EA included proposed measures that were both "Known Commitments" and "Additional Measures". Although originally included as an "additional measure" in the Draft EA, since the time the Draft EA was published, the Board approved amendments to the Cap-and-Trade Regulation on July 27, 2017, which established a framework for a post-2020 Cap-and-Trade Program, among other changes. CARB also included, as part of its approval, a recognition that additional regulatory amendments will be required through a new rulemaking process to implement the requirements of recently enacted Assembly Bill 398 (AB 398, Chapter 135, Statutes of 2017) for the post-2020 Cap-and-Trade Program.

In addition, the proposed 20 percent reduction in GHGs from refineries, which was also included as an additional measure in the Draft EA, has been removed from the Scoping Plan and therefore stricken from the Final EA as well. This is because Assembly Bill (AB) 398 designates the Cap-and-Trade Program as the control measure for combustion CO_2 emissions from refineries and the oil and gas sector. Removal of the refinery measure is not expected to forgo any GHG emissions reductions previously analyzed, as those emissions are still covered by the Cap-and-Trade Program which is now anticipated, consistent with AB 398 direction, to deliver a greater share of reductions needed to achieve the 2030 target.

Given the above-described changes, the "additional measures" portion of the Final EA has been stricken, as all of the proposed measures are now known commitments for the purposes of this analysis.~~While many of the measures discussed in the initial Scoping~~

~~Plan and First Update are currently being implemented or are under development, the Proposed Plan identifies the policies or program enhancements that are needed to achieve the remaining GHG reductions in a complementary, flexible, and cost-effective manner to meet the 2030 target of 40 percent reduction in GHG emissions compared to 1990 levels. The analysis in this Draft EA evaluates the reasonably foreseeable compliance responses associated with implementation of the recommended measures in Chapter II of the Proposed Plan to achieve the 2030 target, which are divided up for the modeling scenario into:~~

~~(a) "Known Commitments" (i.e., existing legislative mandates and actions included in adopted plans or in the process of being developed that are reasonably expected future actions), and;~~

~~(b) "Additional Measures" (i.e., additional actions needed to reach the 2030 target that are not fully achieved by Known Commitments alone).~~

~~As~~ In addition to the post-2020 Cap-and-Trade program described above, and as described more thoroughly in the ~~Proposed~~Scoping Plan, there are ~~some~~ statutory mandates already in place that will contribute to the needed reductions to achieve the 2030 target (e.g., SB 350, which provides important mandates for energy policy), and other existing commitments included in other planning documents that are reasonably expected to occur (e.g. State SIP Strategy). Those actions not yet implemented, but reasonably expected or required by statute, are described as "known commitments" in the ~~Proposed~~Scoping Plan. ~~The Proposed Plan then describes the recommended "additional measures" to close the gap to meet the 2030 target. Both~~ All of the known commitments ~~and the additional measures~~ compose the proposed "project" for purposes of this analysis.

The baseline, for purposes of this Final~~Draft~~ EA, consists of the existing environmental conditions and regulations described in Attachment A of this document. This includes some of the programs that were described in the First Update, and some of which were developed and adopted, but would be subject to further modifications or result in additional compliance responses that could cause environmental effects.

The proposed project, for purposes of this analysis, is the recommended measures in Chapter II of the ~~Proposed~~Scoping Plan that are proposed to achieve the 2030 target. They are listed here briefly and discussed in further detail in Section C, along with reasonably foreseeable compliance responses to implementation of these measures, which forms the basis for the impact analysis.

Known Commitments

1. Renewable Energy and Energy Efficiency, Including SB 350

    a. Behind-the-Meter Photovoltaic (PV) Systems (approximately 10 gigawatts [GW] or more);

b. Demand Response and Flexible Loads

c. SB 350 – Achieve 50 Percent Renewable Portfolio Standard (RPS) by 2030;

d. SB 350 – Doubling of Energy Efficiency Savings by 2030; and

2. Low Carbon Fuel Standard (LCFS) – Increased Stringency (18 percent CI reduction by 2030);

3. Mobile Sources Strategy (Cleaner Technology and Fuels Scenario) and Sustainable Freight Strategy;

4. Short-Lived Climate Pollutant (SLCP) Reduction Strategy; and

5. SB 375 Sustainable Community Strategies – Increased Stringency of 2035 Targets.

~~*Additional Measures*~~

6. Post-2020 Cap-and-Trade Program with Declining Caps and Linkage to Ontario, Canada.~~; and~~

~~7. 20 Percent Reduction in GHGs at Refineries.~~

This Final~~Draft~~ EA focuses on the reasonably foreseeable compliance responses that could result in either a direct or indirect physical change in the environment. Some compliance responses are actions that would not result in environmental effects (e.g., convening a research panel). Such recommended actions are noted and no environmental impacts are associated with their potential implementation.

This section contains a brief description of the recommended measures in Chapter II of the ~~Proposed~~Scoping Plan, along with the reasonably foreseeable compliance responses to implementation of these measures, which forms the basis for the impact analysis in Chapter 4. Please refer to Chapter II of the ~~Proposed~~Scoping Plan document for more information on these measures.

1. Known Commitments

a) Renewable Energy and Energy Efficiency, Including SB 350

i. Description of Measures

(a) Behind the Meter PV

For this proposed measure, behind-the-meter PV is assumed to reach 18.2 GW statewide by 2030. The term, “behind-the-meter,” refers to distributed renewable energy

generation systems that are on the customer side of the meter as opposed to the utility side of the meter. Often, behind-the-meter systems serve the on-site electrical load of the property owner. Combining rooftop solar PV with energy storage systems is part of a larger trend of developing end user capacity, distribution system resources and flexibility, and wholesale transmission market opportunities. The use of storage systems moves electricity from a service to a storable commodity, which fundamentally changes how individual end-users can interact with the electric grid as well as how system operators can manage the grid. Many commercial, industrial, and agricultural ratepayers currently have the most viable use cases for storage systems because time-of-use (TOU) rates and demand charges provide a clear market signal to use stored power for onsite loads to offset electric use from the grid as well as the potential opportunity to sell stored power to the grid subject to present retail and wholesale market rules. Residential ratepayers are not presently subject to default TOU rates and largely use storage for emergency back-up purposes. However, energy storage systems combined with PV can provide power quality and reliability services for all PV systems regardless of whether the system is six kilowatts (kW) or one MW or more. This allows a system owner to manage the variability of its PV system output in a way that avoids production spikes or drops that create voltage, frequency, power factor, or harmonic issues on the distribution grid or with onsite equipment. Technologies and typical storage systems for rooftop solar PV typically include lithium-ion batteries.

(b) Demand Response and Flexible Loads

Demand responses and flexible loads measures would include pricing strategies, regionalization of electricity grids (e.g., procurement of renewable energy from outside of California), and large-scale energy storage systems.

General Overview of SB 350

Senate Bill 350 (Chap. 547, Stats. of 2015) increases the ambition of many state energy programs and creates important new planning mandates. Among other requirements, it requires large publicly-owned utilities and all load-serving entities under the jurisdiction of the California Public Utilities Commission (CPUC) to file integrated resource plans (IRPs) with the California Energy Commission (CEC) and CPUC respectively. Through their IRPs, filing entities will demonstrate how they will meet the electricity sector's share of the State's 2030 GHG reduction target while ensuring reliability in a cost-effective manner while also meeting an RPS requirement of 50 percent by 2030. Per SB 350, the State must also establish annual targets for statewide energy efficiency

savings and demand reduction that will achieve a cumulative doubling of statewide energy efficiency savings in electricity and natural gas end uses by 2030.

(c) SB 350 - Increased Renewable Portfolio Standard to 50 Percent by 2030

Established in 2002 under SB 1078 (Sher, Chapter 516, Statutes of 2002), California's RPS was accelerated in 2006 under SB 107 (Simitian, *Chapter* 464, *Statutes of 2006)* by requiring that 20 percent of electricity retail sales be served by renewable energy resources by 2010. Subsequent recommendations in California energy policy reports advocated a goal of 33 percent by 2020, and on November 17, 2008, Governor Arnold Schwarzenegger signed Executive Order S-14-08 requiring that "…[a]ll retail sellers of electricity shall serve 33 percent of their load with renewable energy by 2020." SB X1-2 (Simitian*, Chapter* 1, Statutes of *2011)* was signed by Governor Brown, Jr., in April 2011 setting the RPS target at 33 percent by 2020. This new RPS applied to all electricity retailers in the state including publicly owned utilities, investor-owned utilities, electricity service providers, and community choice aggregators. These entities were required to adopt the new RPS goals of 20 percent of retail sales from renewables by the end of 2013, 25 percent by the end of 2016, and the 33 percent requirement being met by the end of 2020.

Under the ~~Proposed~~Scoping Plan, the RPS of 50 percent renewables by 2030 as required by SB 350 is included to help achieve the 2030 target.

(d) SB 350 - Doubling of Energy Efficiency in Existing Buildings by 2030

The doubling of energy savings in electricity and natural gas end uses by 2030 is also required by SB 350. This could be achieved through appliance and building energy efficiency standards, utility incentives, rebates, technical assistance programs, and other programs to incentivize or require retrofits to existing buildings. Generally, this measure revolves around reduced fossil fuel use and overall energy demand.

ii. Reasonably Foreseeable Compliance Responses

The reasonably foreseeable compliance responses associated with implementation of proposed measures for renewable energy and energy efficiency, including SB 350 would range from minor modifications to existing buildings and large-scale construction projects that would allow for increased use of renewable energy and storage of produced renewable energy. Additional renewable energy supplies would be produced from new wind, solar thermal, solar photovoltaic, geothermal, solid-fuel biomass, biogas, and small hydroelectric facilities. These may require new and upgraded transmission lines to move the electricity from the source of generation to substations near population centers. Individual energy projects augment electrical grids by capturing excess electrical energy during periods of low demand and storing it in other forms until needed on an electrical grid. This energy storage may be procured from buildings, such

as solar panels, and from large-scale renewable energy facilities. Energy storage systems are expected to consist of lithium battery-based systems. These systems are likely to be in industrial areas and cover large areas of land (i.e., more than one acre). In addition, regionalization of the grid may result in increased construction and operation of renewable energy projects. Expansion of the energy grid would require upgraded and new transmission lines.

Doubling of energy efficiency at existing buildings would include modifications to buildings, such as replacement of heating, ventilation, and air conditioning (HVAC) systems with heat pumps and installation of more efficient water heaters. Other upgrades, such as installation of more efficient insulation, window replacements, and whole house or whole-building retrofits could occur as well, with the overall goals of creating zero net energy buildings. These activities would occur over a long period, such that the existing production rate of equipment would be sufficient to meet demand. That is, there would be no new manufacturing facilities needed or other earth-moving activities.

b) Decreased Carbon Intensity Levels under the Low Carbon Fuel Standard

i. Description of Measures

Since approval of the First Update, the LCFS regulation has been approved and amended as the result of numerous actions by CARB. The LCFS regulation requires transportation fuel providers to procure clean fuels to reduce the carbon intensity of California's fuel mix by at least 10 percent by 2020. The LCFS provides a market signal to incentivize the use of low-carbon intensity fuels, such as ethanol, renewable gasoline, hydrogen, electricity, renewable diesel, biodiesel, and using captured methane as a transportation fuel, among other clean fuel options. The regulation is market-based and fuel-neutral. The incentive structure of the program is anticipated to shift the types and locations from which feedstocks are used to produce ethanol toward lower-carbon options, to increase the use of biomass-based fuels such as biodiesel and/or renewable diesel in lieu of petroleum, and to encourage the use of electricity and other zero-emission fuels. The ~~Proposed~~Scoping Plan recommends increased stringency of the LCFS to meet a CI of at least 18 percent in California's fuel mix by 2030, as modeled in the CARB Mobile Source Strategy under the Clean Fuels and Technology scenario. Future regulatory actions will be needed to implement this measure.

ii. Reasonably Foreseeable Compliance Responses

Reasonably foreseeable compliance responses to a CI reduction of at least 18 percent in the LCFS regulation could include incentives for various projects, such as processing plants for agriculture-based ethanol, cellulosic ethanol, and biomethane. Such incentives could result in minor expansions to existing operations, such as collection of natural gas from landfills, dairies, and wastewater treatment plants, modifications to crude production facilities (e.g., onsite solar, wind, heat, and/or steam generation

electricity), and installation of energy management systems at refineries. It is also reasonably foreseeable that some existing fossil refiners my start to produce biofuels. This may require some minor modifications to existing sites to retrofit onsite technologies and equipment.

c) Mobile Sources Strategy (Clean Technology and Fuels Scenario) and Sustainable Freight Strategy

A summary is provided below of the portions of the Mobile Sources Strategy Clean Technology and Fuels (CTF) scenario relied upon in the ~~Proposed~~Scoping Plan and the associated reasonably foreseeable compliance responses. (To be clear, "Clean Technology and Fuels" is the name of a modeled compliance strategy, not a description of specific measures). The ~~Proposed~~Scoping Plan focuses on four of the five source categories included in the Mobile Sources Strategy and included in the Sustainable Freight Strategy:

1. On-Road Light-Duty Sector;
2. On-Road Heavy-Duty Sector;
3. Off-Road Federal and International Sources; and
4. Off-Road Equipment.

The measures described below are also included in the ~~Proposed~~ 2016 State Strategy for the State Implementation Plan (State SIP Strategy). An environmental analysis was prepared for the State SIP Strategy entitled Final~~Draft~~ Environmental Analysis prepared for the Proposed State Strategy for the State Implementation Plan~~, released for comment on May 17, 2016~~.[1] Please refer to both the State SIP Strategy and the Final~~Draft~~ EA for the State SIP Strategy, which is incorporated by reference, for a more thorough description of the measures, potential compliance responses, and potential impacts. Below is a summary of the measures under each topic area along with the reasonably foreseeable compliance responses, which are used to evaluate the environmental impacts. While the CTF scenario within the Mobile Sources Strategy may vary slightly from the State SIP Strategy in regards to precise intensity of measures and recommended additional deployment of zero-emission vehicles (ZEVs), these variations would result in the same compliance responses and environmental impacts as discussed in this Final~~Draft~~ EA and referenced in the Final~~Draft~~ EA for the State SIP Strategy. Throughout the remainder of the Final~~Draft~~ EA the measures described below will be referred to as the State SIP Strategy measures.

[1] State SIP Strategy documents available at https://www.arb.ca.gov/planning/sip/2016sip/2016sip.htm

i. Description of Measures

(a) On-Road Light-Duty

The on-road light-duty transportation sector includes light-duty vehicles (LDVs) up to 8,500 lbs. such as passenger cars, minivans, most sport utility vehicles, pickup trucks, and motorcycles.

(i) Advanced Clean Cars 2

For this proposed measure, CARB staff would develop a regulation based on the technology and market assessments for advanced technology vehicles that would increase the number of new ZEVs and Plug-In Hybrid Electric Vehicles (PHEVs) sold in California. The regulation may include lowering fleet emissions further beyond the super-ultra-low-emission vehicle (SULEV) standard for the entire light-duty fleet through at least the 2030 model year, and look at ways to improve real world emissions through implementation programs. Additionally, new standards would be considered to further increase the sales of ZEVs and PHEVs in 2026 (and later years) beyond the levels required to ensure future emission reduction, climate, and petroleum targets are met.

(ii) Lower In-Use Emission Performance Assessment

This measure would evaluate California's in-use performance-focused inspection and maintenance procedures for LDVs and medium-duty vehicles (MDVs) and, if necessary, make improvements to further the program's effectiveness. CARB would conduct a study to further evaluate California's in-use performance inspection procedures through analysis of the Smog Check database and vehicle sampling obtained through the California Bureau of Automotive Repairs (BAR) Random Roadside Inspection Program.

(iii) Further Deployment of Cleaner Technologies: Light-Duty Vehicles

This proposed measure is designed to achieve further emission reductions through a suite of additional actions, including early penetration of near-zero and zero emission technologies, and emission benefits associated with increased transportation efficiencies, as well as the potential for autonomous vehicles and advanced transportation systems.

(b) On-Road Heavy-Duty

The on-road heavy-duty vehicles (HDVs) sector includes heavy-duty gas and diesel trucks, urban and school buses, and motorhomes. The heavy-duty sector is diverse, with many different technologies and approaches that could achieve emissions reductions. Heavy-duty trucks that operate in California travel long distances with about

60 percent of the trucks originating from out-of-state. Some trucks, however, are part of local fleets with centralized fueling that operate in shorter distances.

(i) Lower In-Use Emission Performance Level

This measure consists of developing new, supplemental actions, in the form of regulatory amendments or new regulations to address in-use emission compliance and to decrease engine deterioration and improve efficiency. The suite of actions would include: amendments to CARB's existing Periodic Smoke Inspection and Heavy-Duty Vehicle Inspection Programs to revise the current opacity limit and make other program improvements; amendments to warranty and useful life provisions; amendments to the durability demonstration provisions within the certification requirements for heavy-duty engines; amendments to the not-to-exceed supplemental test procedures for heavy-duty diesel engines; and a comprehensive heavy-duty vehicle inspection and maintenance program.

(ii) Low-oxides of nitrogen (NOx) Engine Standard

CARB began development of new heavy-duty low-NOx emission standards in 2016, and Board action is expected in 2019. CARB staff will coordinate as much as possible with U.S. EPA and urge U.S. EPA to develop a similar federal standard. The goal of this measure is to introduce near-zero emission engine technologies that would substantially lower NOx emissions from on-road HDVs. Deployment of lower NOx combustion engines coupled with the use of renewable fuels will help the State attain near-term air quality and climate goals.

(iii) Medium and Heavy-Duty GHG Phase 2

Staff plans to propose a California Phase 2 regulation that harmonizes with the federal Phase 2 regulation in structure, timing, and stringency. However, there will be minor differences to facilitate enforcement, align with existing California programs, and provide incentives for manufacturers to bring advanced technologies to the market. CARB staff plans to present a California Phase 2 proposal for the Board's consideration in 2017. In addition, CARB is funding research into further aerodynamic improvements for trailers and vocational vehicles, and depending on the outcome of that research, may in 2019 propose regulations with additional requirements for trailer and vocational vehicle aerodynamics beyond what Phase 2 requires.

(iv) Innovative Clean Transit

CARB would develop and propose a variety of approaches and mechanisms to support the transition to a suite of innovative clean transit options. CARB has convened a technical workgroup and a transit agency subcommittee to inform key data collection and analysis, and help develop and refine potential approaches. These approaches may include: 1) securing binding commitments from the state's transit providers for a

long-term vision for transitioning to zero-emission buses and other technologies. Progress towards this zero-emission goal would be tracked through emissions related metrics such as aggregate emissions per fleet or per capita for the individual transit agencies; 2) continuing to support to the maximum extent possible the near-term deployment of zero-emission buses into service where transit agency commitments exist or new actions where the economics become viable and transit service can be maintained, expanded, or enhanced; and 3) working with transit agencies to pilot innovative approaches, including the use private sector shared vehicle services, to enhance access to existing transit systems with zero-emission first and last-mile solutions. These zero-emission technologies exist today and can serve as an immediate step towards the deployment of a modern, long-term zero-emission transit system.

(v) Last Mile Delivery

Under this measure, CARB would develop and propose a regulation that would require the use of low-NOx engines and the purchase of zero-emission trucks for class 3-7 (gross vehicle weight rating above 10,000 pounds) last mile delivery trucks in California.

(vi) Innovative Technology Certification Flexibility

Under this measure, CARB would develop and propose an Innovative Technology Certification Flexibility regulation that would provide tiered CARB certification and OBD requirements for an innovative heavy-duty engine or vehicle technology, providing targeted flexibility at market launch and early technology deployment stages, and reverting back to full CARB approval requirements once the technology achieves a market foothold.

(vii) Zero-Emission Airport Shuttle Buses

CARB would develop and propose a regulation or other measures to deploy zero-emission airport shuttles in order to further support market development of zero-emission technologies in the heavy-duty sector.

(viii) Incentive Funding to Achieve Further Emission Reductions from On-Road Heavy-Duty Vehicles

This measure would use existing incentive and other innovative funding programs to help increase the penetration of near-zero and zero heavy-duty trucks. Funding mechanisms would target technologies that meet an optional low-NOx standard through 2023, when implementation of a new low-NOx standard would begin and the current round of Carl Moyer program funding ends.

(ix) Further Deployment of Cleaner Technologies: On-Road Heavy-Duty Vehicles

This proposed measure is designed to achieve further emission reductions through a suite of additional actions, including early penetration of near-zero and zero emission technologies, and emission benefits associated with increased transportation efficiencies, as well as the potential for autonomous vehicles and advanced transportation systems.

(c) Off-Road Federal and International Sources

The off-road federal and international sources category includes emissions associated with ships, locomotives, and aircraft. These sources are primarily regulated by the federal government and international organizations.

(i) More Stringent National Locomotive Emission Standards

CARB would petition U.S. EPA for new national locomotive emission standards for significant additional reductions in criteria and toxic pollutants, and GHG emissions from existing and future locomotives. CARB staff estimates that U.S. EPA could require manufacturers to implement the new locomotive emission regulations by as early as 2023 for remanufactures and 2025 for newly manufactured locomotives.

(ii) Tier 4 Vessel Standards

Under this action, CARB would work with U.S. EPA, U.S. Coast Guard, and international partners to urge the International Maritime Organization (IMO) to adopt more stringent emission standards for new ocean-going vessels and efficiency requirements for existing vessels. Specifically, CARB would advocate for a Tier 4 NOx standard for new marine engines on ocean-going vessels and vessel efficiency requirements for the existing in-use fleet.

(iii) Incentivize Low Emission Efficient Ship Visits

CARB staff would work with California seaports and other stakeholders to develop criteria for a Low Emission Efficient Ship, targeting NOx, diesel PM, GHG, and sulfur oxide emissions. CARB would also pursue partnerships with other jurisdictions and ports along the Pacific shipping corridor to develop a “green lane” concept with multiple small incentives for cleaner vessels that add up to sufficient financial benefit to change the decisions of vessel operators about which vessels are deployed on which routes. The goal of this measure is to achieve early implementation of clean vessel technologies (e.g., liquefied natural gas, Tier 3 standards or better) and incentivize vessels with those technologies in California service.

(iv) At-Berth Regulation Amendments

CARB would evaluate how the regulation can be amended to achieve further emission reductions by including smaller fleets, additional vessel types (including roll-on/roll-off vehicle carriers, bulk cargo carriers, and tankers), and additional operations.

(v) Further Deployment of Cleaner Technologies: Off-Road Federal and International Sources

This proposed measure would be designed to achieve further emission reductions through a suite of additional actions, including early penetration of cleaner technologies and emission benefits associated with increased efficiencies.

(d) .Off-Road Equipment

The off-road equipment category encompasses lawn and garden equipment, transport refrigeration units, vehicles and equipment used in construction and mining, forklifts, cargo handling equipment, commercial harbor craft, and other industrial equipment.

(i) Zero-Emission Off-Road Forklift Regulation Phase 1

CARB would develop and propose a regulation to increase penetration of ZEVs in off-road applications, with specific focus on forklifts with lift capacities equal to or less than 8,000 pounds for which zero-emission technologies have already gained appreciable customer acceptance and market penetration. The regulation could also include requirements that result in the deployment of zero-emission technologies in heavier equipment that remains at a particular location for extended periods of time or other similar provisions that would spur further technology innovation.

(ii) Zero-Emission Off-Road Emission Reduction Assessment

CARB would provide the Board with an informational update regarding the status of ZEVs in off-road applications once the Phase I Forklift Regulation is in place. The update would be the result of a technology assessment, and would identify opportunities to further expand their use. The information obtained from this technology review would be used to inform the development of Phase 2 of the Zero-Emission Off-Road Regulation. The Zero-Emission Off-road Phase 2 Regulation would build upon the Phase 1 regulation and focus primarily on larger, higher power-demand equipment types (e.g., large forklifts, construction equipment). The scope and timeframe of the regulation would depend upon advancements in technology and information obtained through the Advanced Off-Road Emission Reduction Assessment.

(iii) Zero-Emission Off-Road Worksite Emission Reduction Assessment

CARB staff would conduct an assessment and provide the Board with an informational update regarding an analysis of the technologies and/or strategies that increase worksite efficiency, such as connected vehicles, automation, and fleet management technologies in off-road sectors. Advanced machine control and worksite integration technologies that are commercially available today reportedly hold the potential for fuel savings of more than 30 percent, depending on worksite conditions.

(iv) Zero-Emission Airport Ground Support Equipment

CARB would develop and propose a regulation to transition diesel and large spark ignition (LSI) airport ground support equipment (GSE) to zero-emission technology. The current commercial availability of several GSE equipment types indicates the feasibility of this transition. Battery-electric GSE are the most common type of zero-emission GSE, and are available for several high-population equipment types. Many large air carriers which operate diesel GSE have already begun using electric equipment. The added introduction of zero-emission GSE would act as a catalyst to further zero-emission equipment penetration in the off-road equipment sector and other heavier duty-cycle and longer-range applications.

(v) Small Off-Road Engines

CARB will develop and propose regulations to reduce emissions from small off-road engines through tightened exhaust and evaporative emission standards. High failure rates have been observed in evaporative emissions testing of small off-road equipment, preventing previously-claimed emission reductions from being realized. Exhaust and evaporative emissions from SORE would be reduced through enhanced enforcement of the current emission standards, adoption of tighter exhaust and evaporative emission standards, and increased use of zero-emission equipment. Strategies will be developed for transitioning to zero-emission technologies, including an initial focus on incentives for use of zero-emission equipment, coupled with increasingly stringent emission standards for criteria pollutants and GHGs.

(vi) Transport Refrigeration Units Used for Cold Storage

CARB would develop and propose a regulation to reduce NOx, PM, and GHG emissions by prohibiting the use of internal combustion engine powered transport refrigeration units (TRUs) for cold storage in phases, with potential incentive support for infrastructure. The proposed regulation would limit the amount of stationary operating time that a transport refrigeration system powered by an internal combustion engine could operate at certain facilities. Development and use of zero-emission technologies, such as all-electric plug-in / advanced battery transport refrigeration systems would be

encouraged, as well as adequately-sized cold storage facilities, and more efficient inbound delivery appointment and outbound dispatch scheduling.

(vii) Further Deployment of Cleaner Technologies: Off-Road Equipment

This proposed measure would be designed to achieve further emission reductions through a suite of additional actions, including early penetration of near-zero and zero-emission technologies, and emission benefits associated with the potential for worksite integration and efficiency, as well as connected and autonomous vehicle technologies.

ii. Reasonably Foreseeable Compliance Responses

Reasonably foreseeable compliance responses associated with the proposed measures include: increased infrastructure for natural gas and hydrogen refueling stations; increased demand for lithium battery manufacturing and associated increases in lithium mining and exports; increased recycling or refurbishment of lithium batteries; and increased emission testing of vehicles which may cause construction of new testing centers to monitor vehicle emissions throughout the State. It is anticipated that the replacement rate of on-road light-duty and heavy-duty vehicles, as well as off-road equipment and engines, would be increased, requiring that older models are sold outside of California, scrapped, or recycled. Compliance responses could also include construction and operation of new manufacturing facilities to support zero and near-zero emission technologies and increased manufacturing of low-NOx engines.

d) Short-Lived Climate Pollutant Reduction (SLCP Strategy

i. Description of Measures

SLCPs include methane, black carbon, and hydrofluorocarbons (HFCs). They are powerful GHGs that remain in the atmosphere for a much shorter period than longer-lived climate pollutants, such as carbon dioxide (CO_2) and nitrous oxide (N_2O). Despite their relatively shorter atmospheric lifespan, their relative potency in terms of how they heat the atmosphere (i.e., global warming potential [GWP]) can be tens, hundreds, or even thousands of times greater than that of CO_2.

Under SB 605 (Lara, Chapter 523, Statutes of 2014) and SB 1383 (Lara, Chapter 395, Statutes 2016), CARB developed the Revised Proposed SLCP Reduction Strategy (SLCP Strategy), released for public review on November 28, 2016. That process included coordination with local and State agencies, academic experts, businesses, organizations, and other stakeholders. Through mandatory and voluntary measures, incentives, and other policies and plans, the SLCP Strategy aims to identify a statewide plan to encourage reductions in emissions of black carbon, methane, and HFCs in the State. For the purposes of the ~~Proposed~~Scoping Plan, only the measures focused on Methane and HFC are included and discussed in this Final~~Draft~~ EA, because these are the gases included in the inventory supporting the 2030 target.

An EA was prepared for the proposed SLCP Strategy entitled Final~~Revised Draft~~ Environmental Analysis prepared for the Proposed Short-Lived Climate Pollutant Reduction Strategy~~, released for comment on November 28, 2016~~.[2] Please refer to that document, which is incorporated by reference, for a more thorough description of the measures, potential compliance responses, and potential impacts. The reasonably foreseeable compliance responses to implementation of Methane and HFC measures in the SLCP Strategy are summarized briefly below for purposes of the analysis in this EA.

ii. Reasonably Foreseeable Compliance Responses

(a) Methane

Implementation of methane reduction measures under the SLCP Strategy consist of actions at dairies, landfills, wastewater treatment plants, and oil and gas facilities. The reasonably foreseeable compliance responses related to these measures is described below.

Some of the State's existing dairies may convert flush-water lagoon manure management systems, which are currently used at most dairies, to solid manure management systems. Solid manure management systems could include scrape systems, anaerobic digestions systems, or pasture based systems. Conversion to solid manure management systems would potentially involve construction activities related to installing scrape systems or using equipment such as manure vacuums, storage silos and tanks, manure drying pads, and related manure handling equipment and storage facilities. The installation of anaerobic digesters would result in the installation and operation of a variety of industrial-type equipment and infrastructure at dairies. This may include electricity generation equipment, biogas storage tanks, compression and cleaning equipment, above ground pipeline systems, transmission poles and wires, and vehicle fueling stations. Conversion of dairy operations to pasture-based management may require new irrigation facilities, fencing, and structures to support animal husbandry (e.g., to provide shelter). Additionally hybrid models that employ aspects of both pasture and conventional systems should also be investigated for their potential benefits and impacts for dairy and livestock operations. Finally, dairy operators may install anaerobic digestion systems to capture and utilize manure methane on site. Collected manure could also be transported to centralized digesters, transported via dedicated pipelines to a centralized cleanup and pipeline injection facility and potentially co-digested with other feedstocks (such as food waste) for increased fuel production.

It is anticipated that this measure would result in the development of up to 100 new or expanded organic material composting and/or digesting facilities throughout the State. It is anticipated that new facilities would be sited near or at existing waste disposal sites or landfills. Much of the material diverted to these facilities, typically by truck transport, would consist of yard or green wastes, but may also include other regional sources of

[2] SLCP Reduction Strategy documents available at https://www.arb.ca.gov/cc/shortlived/shortlived.htm

organic wastes such as food or agricultural produce. Most of the organic material diverted to new or existing composting facilities would be expected to be converted to compost. The typical kinds of equipment that would be installed and operated at compost facilities include tractors, compost turners, and grinders. The installation of anaerobic digesters would result in the installation and operation of a variety of industrial-type equipment and infrastructure at composting facilities (which potentially may include electricity generator sets, biogas storage tanks and compression and cleaning equipment, above ground pipeline systems, transmission poles and wires, and vehicle fueling stations). Captured biogas could potentially be used for on or off-site electricity generation, or cleaned and compressed for use as a natural gas pipeline supplement or as a vehicle fuel.

It's anticipated that some of California's existing, and potentially new, wastewater treatment plants that operate anaerobic digesters may install additional equipment to collect, store, and co-digest regionally-sourced organic wastes (such as food, cooking grease byproducts, and agricultural produce waste), and install other equipment and infrastructure to use captured biogas for beneficial purposes. Captured biogas could potentially be used for on or off-site electricity generation, or cleaned and compressed for use as a natural gas pipeline supplement or as a vehicle fuel. The use of digester biogas for these purposes would potentially result in the installation and operation of a variety of equipment and infrastructure at wastewater treatment plants (which potentially may include electricity generator sets, biogas storage tanks and compression and cleaning equipment, above ground pipeline systems, transmission poles and wires, and vehicle fueling stations). The operational nature of existing wastewater treatment plants would potentially expand from the single function of treating wastewater, to include multiple functions such as generating electricity for on-or off-site consumption, distributing pipeline gas, vehicle fueling, and organic waste diversion, handling, and disposal. These infrastructure additions to existing plants could be accommodated within the existing footprint of the facilities or may require facility expansion.

Implementation of CARB's regulation for oil and gas facilities could result in construction modifications to existing facilities, such as the installation of vapor recovery systems, the installation of low-bleed or zero-bleed pneumatic devices, and the replacement of leaking equipment. This could include construction activities related to the installation or replacement of pipelines, flanges, valves and similar features already associated with oil and gas facilities. Collected vapors would be routed to sales gas lines, microturbines, fuel gas system, low-NOX flares, or underground injection wells. These equipment construction and installation activities would typically occur within the footprint of existing oil and gas facilities. A Final EA was prepared for this regulation and the Board approved the regulation on March 23, 2017.~~A draft EA was prepared for this proposed regulation and released for public review with the ISOR on May 31, 2016. It is expected the Board will consider approving this regulation in early 2017.~~

(b) Hydrofluorocarbons

The SLCP Strategy contains actions to reduce HFC emissions within the State. These strategies could require replacing high-GWP HFCs used as refrigerants, foam expansion agents, aerosol propellants, and to a lesser extent, as solvents and fire suppressants, with low-GWP compounds such as ammonia, CO2, hydrocarbons, lower-GWP HFCs, and hydrofluoro-olefins (HFOs). Replacement of high-GWP compounds with low-GWP compounds would result in increased demand for low-GWP compounds (e.g. increased demand for HFOs) and modification to existing facilities. The increased demand for low-GWP compounds would occur because of the global HFC phase-down, and the possible incremental increased demand from the SLCP Strategy alone would not lead to an increase of facilities to manufacture these compounds. In many cases, using drop-in blends and/or low- or lower-GWP HFCs would require minor modifications to existing facilities, such as changes in the types of lubricants and compressor calibrations for foam production and refrigeration units. However, if CO2-, hydrocarbon-, or ammonia-based systems are used, a complete retrofit of equipment would likely be necessary. Local permitting agencies may apply additional oversight on the planning and operations of refrigeration equipment using flammable refrigerants such as hydrocarbons, and toxic refrigerants such as ammonia.

e) Increased Stringency of SB 375 2035 Targets for Sustainable Communities Strategies

i. Description of Measure

SB 375 supports the State's climate action goals to reduce GHG emissions through coordinated transportation and land use planning with the goal of more sustainable communities. Sustainable Communities Strategies (SCSs) are developed by regional metropolitan planning organizations (MPOs) and involve coordination with: local, regional, and ~~states~~ State agencies; community groups; advocates; and other public stakeholders. Approved SCSs contain land use policies and transportation strategies recognized to reduce GHG emissions associated with reductions in vehicle miles travelled (VMT) for cars and light trucks (i.e., passenger vehicles). A summary of the types of strategies and reasonably foreseeable compliance responses associated with ~~land use and transportation strategies that are reasonably foreseeable under~~ more stringent SB 375 targets are provided below.

(a) Land Use Strategies

It would be expected that to further reduce passenger vehicle-related GHG emissions, mixed use, high density, and infill development would be applied in areas where such development is feasible. Land use strategies could include infill development, increased residential and mixed-use density planning and construction, Transit Oriented Development (i.e., concentrated development within ½ mile from transit centers), and preservation of open space.

(b) Transportation Strategies

Transportation strategies reduce passenger vehicle-related emissions through various physical changes in the availability ~~of~~or form of transportation other than single occupancy vehicles. Alterations in road structure, transit and infrastructure investments, incentive programs, and advancements in technology comprise the backbone of transportation strategies. Strategies included in approved SCSs, and are foreseeable in future SCSs under a more stringent SB 375 targets, include the following:

- Active Transportation/Complete Streets
  - Active transportation (walking and bicycling) requires design and infrastructure to support safe and efficient movement of pedestrians and bicyclists. Walking and bicycling opportunities can be provided through the establishment of walking-only and bicycling-only routes within a community. Greenbelts containing bike lanes and walking paths may be developed to ensure rider and pedestrian safety associated with the dangers of automobiles.
  - A complete street is composed of dedicated lanes for all forms of transportation. These include sidewalks for pedestrians, bike lanes for bicyclists, lanes for single occupancy vehicles, and designated rails and/or routes for transit vehicles (e.g., light rail, bus rapid transit). The design of a complete street aims to maximize the safety and efficiency of all types of transportation.

- Increased Transit Operations and Efficiency
  - Transit operations and efficiency can be improved through increased transit destination availability and frequency of service. Priority lanes and rails for transit vehicles (e.g. bus rapid transit, commuter rails) can additionally improve service times. In addition, while not directly incentivized by more stringent targets, natural gas powered, ZEV, and PHEV buses and electric commuter rails can be incorporated into improved transit systems to further reduce GHG emissions.

- Transportation Demand Management
  - Transportation Demand Management includes strategies designed to influence and alter consumer behaviors. Local jurisdictions can use incentives to elicit changes in what modes of transportation are used. For example, managed lanes for carpools, vanpools, buses, and shuttles reduce time loss related to traffic. The ability to bypass traffic during peak hours is an attractive benefit and can influence consumers ~~during vehicle purchase~~to use more GHG-efficient transportation mode alternatives to the single occupancy vehicle.

- Transportation Systems Management
  - Transportation Systems Management (TSM) strategies include physically altering roadways to enhance the efficiency of transportation

to reduce GHG emissions. TSM aims to reduce the emissions by streamlining traffic patterns, through improvements such as: ~~stop sign with~~ roundabouts, traffic signaling optimization, and ramp metering~~, and routine roadway maintenance~~.

- ZEV and PHEV Charging Infrastructure
  - ZEVs and PHEVs provide opportunities to further reduce GHG emissions from passenger vehicle travel with zero and near-zero emissions ~~replacements for existing single occupancy~~ vehicles ~~alternatives~~. ~~Consistent with~~To support the goals of existing regulations (e.g., Advanced Clean Cars), MPOs and local jurisdictions would provide hydrogen fueling and electric charging infrastructure beyond State requirements and incentives to support a future ZEV and PHEV fleet.

ii. Reasonably Foreseeable Compliance Responses

Reasonably foreseeable compliance responses related to SB 375 target updates could include changes to land use strategies, such as planning and construction of new housing, commercial and industrial development focused in urban areas, and preservation of open space. Reasonably foreseeable compliance responses to the implementation of transportation strategies associated with the SB 375 target updates could also include a variety of improvements to roadways and new infrastructure. Roadway improvements could include construction of bicycle and pedestrian lanes and facilities, high occupancy vehicle lanes, traffic calming infrastructure (e.g., roundabouts, ramp metering)~~, and increased maintenance activities~~. New infrastructure associated with approved SCSs could include commuter rail lines, electric charging and hydrogen fueling infrastructure, and new manufacturing or modified facilities to accommodate increased use of ZEVs and PHEVs.

~~2. Additional Measures~~

~~As discussed in the Proposed Plan, the known commitments described above are not sufficient to achieve the 2030 target. The Proposed Plan scenario also recommends~~ includes ~~a Post 2020-Cap-and-Trade Program with declining caps and a 20 percent reduction by 2030 in GHG emissions from the refinery sector from current levels. These additional measures are described in more detail than the known commitments below since~~ it is a ~~they are new recommended actions and not already required by statute or part of existing plans.~~

f) Post-2020 Cap-and-Trade Program with Declining Caps and Linkage to Ontario, Canada

Although originally included as an “additional measure” in the Draft EA, the Board approved amendments to the Cap-and-Trade Regulation on July 27, 2017, which established a framework for a post-2020 Cap-and-Trade Program, among other

changes. CARB also included, as part of its approval, a recognition that additional regulatory amendments will be required through a new rulemaking process to implement the requirements of recently enacted Assembly Bill 398 (AB 398, Chapter 135, Statutes of 2017), which clarifies the role of the Cap-and-Trade Program through 2030 and also identifies the Cap-and-Trade Program as the rule for petroleum refineries and oil and gas production facilities to achieve their greenhouse gas emissions reductions for the post-2020 Cap-and-Trade Program. Any future changes to that regulation would undergo the same rigorous and open process that includes technical, environmental, and economic analyses, and public review and input specific to that proposal. Additional details on the most recently-approved Cap-and-Trade Regulation amendments may be found on the Cap-and-Trade rulemaking page at https://www.arb.ca.gov/regact/2016/capandtrade16/capandtrade16.htm.

The current Cap-and-Trade Program was first discussed in the initial Scoping Plan CEQA Functional Equivalent Document (2008 FED) and was also included in the First Update to the Climate Change Scoping Plan Environmental Analysis (First Update EA). Prior to the adoption of the Cap-and-Trade Program in 2011, CARB prepared a programmatic EA in a document entitled *Functional Equivalent Document prepared for the California Cap on GHG Emissions and Market-Based Compliance Mechanisms* (2010 FED) [3],, included as Attachment O to the Staff Report: Initial Statement of Reasons (ISOR) released for public review and comment in November 2010. The 2010 FED analysis was based on the expected compliance responses of the covered entities, identified as: (1) upgrade equipment; (2) decarbonization (fuel switching); (3) implement process changes; and (4) surrender compliance instruments. The 2010 FED also analyzed the potential indirect impacts associated with development of offset projects based on the four Compliance Offset Protocols then being proposed: (1) ODS Projects; (2) Livestock Projects; (3) Urban Forest Projects; and (4) U.S. Forest Projects.

The following section summarizes the proposed strategy and reasonably foreseeable compliance responses resulting from a Post-2020 Cap-and-Trade Program (Cap-and-Trade Program) with declining caps and linkage to Ontario, Canada. The anticipated compliance responses to various actions discussed in this section focus on those activities with the potential to result in either a direct or indirect physical change in the environment. These include construction activities, infrastructure and equipment installations, and significant operational changes to facilities. While purchasing of compliance instruments is a reasonably foreseeable compliance response, it would not result in direct or indirect physical effects on the environment and therefore is not discussed further.

An EA, which builds upon the original analysis included in the 2010 FED, was prepared for a Post-2020 Cap-and-Trade Program, entitled ~~Draft~~Final Environmental Analysis prepared for the Proposed Amendments to the California Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms Regulation, ~~released for~~

[3] Cap-and-Trade 2010 documents available at https://www.arb.ca.gov/regact/2010/capandtrade10/capandtrade10.htm

~~comment on August 2, 2016~~certified by the Board on July 27, 2017.[4] Please refer to that document, which is incorporated by reference, for a more thorough description of the measures, potential compliance responses, and potential impacts. Below is a summary of the measures under each topic area along with the reasonably foreseeable compliance responses, which are used to evaluate the environmental impacts.

i. Description of Measures and Compliance Responses

(a) Establish Post-2020 Caps

The Post-2020 Cap-and-Trade Program approved by the Board on July 27, 2017 ~~would~~ set declining caps for the post-2020 program. The initial cap level in 2013 was set at the level of emissions expected from covered sources for that year – at 162.8 million metric tons of carbon dioxide equivalent ($MMTCO_2e$). The cap then declined to 159.7 $MMTCO_2e$ in 2014. In 2015, the program expanded to include GHG emissions from fuel suppliers, based on the level of GHG emissions expected from the covered fuels for the year 2015, resulting in a cap expansion in 2015 to 394.5 $MMTCO_2e$. ~~The cap will continue to decline through 2020 under the current Regulation.~~

The level of the cap is critical to the environmental effectiveness of the Cap-and-Trade Program. If the cap is not set at a stringent enough level to drive GHG emission reduction activities, the environmental goals of the Program may not be met even if all sources comply with Program requirements. Staff designed the ~~current~~ Program to be sufficiently stringent to spur GHG emission reductions to achieve AB 32 goals. Staff set the cap for 2020 at 334.2 $MMTCO_2e$, which was designed to allow California to achieve the AB 32 target in 2020.

~~As with the current program, t~~The levels of the post-2020 caps are also critical to the environmental effectiveness of the Cap-and-Trade Program. Therefore, staff proposed post-2020 caps to be sufficiently stringent to continue to spur GHG emission reductions to achieve AB 32 goals and the interim 2030 GHG reduction target. Staff proposed the cap for 2030 at 200.5 $MMTCO_2e$, which represents about 80 percent of the statewide target. As mentioned above, additional regulatory amendments will be required through a new rulemaking process to implement the requirements of recently enacted Assembly Bill 398 (AB 398, Chapter 135, Statutes of 2017) for the post-2020 Cap-and-Trade Program. ~~Additional details regarding the development of post-2020 caps may be found in the Staff Report for Proposed 2016 Cap-and-Trade Amendments.~~[5]

[4] Cap-and-Trade 2016 and 2017 documents available at https://www.arb.ca.gov/regact/2016/capandtrade16/capandtrade16.htm

[5] ~~Cap-and-Trade 2016 documents available at https://www.arb.ca.gov/regact/2016/capandtrade16/capandtrade16.htm~~

Reasonably Foreseeable Compliance Responses

The 2010 FED prepared for the Cap-and-Trade Program as originally proposed detailed reasonably foreseeable compliance responses for each covered sector resulting from the Cap-and-Trade Program. Compliance responses from covered sectors generally include energy efficiency measures to reduce fuel consumption, switching to less carbon-intensive fuel, increasing combustion efficiency, upgrading aged equipment, installing cogeneration for more efficient production, altering a process to make production more efficient, changing the composition of a manufactured product to one that is less energy-intensive to manufacture, and sector-specific emission mitigation technologies.

Energy efficiency upgrades are generally the least expensive compliance option, and therefore, the most likely to have been implemented first. As the cap declines further post-2020, covered entities may need to implement other options to further reduce their emissions. An increase in electrification in the transportation sector is also expected to yield GHG reductions in this sector.

Declining caps are expected to yield increased investment in energy efficiency, equipment and process upgrades, and clean technology. Staff expects the continuation of the program post-2020 to yield similar compliance responses as the current program, but to go further in implementing GHG reduction measures where feasible. This is particularly likely if the cost of compliance instruments continues to rise, increasing the economic favorability of installing equipment and process upgrades. Staff expects that a few covered sectors such as nitric acid producers and fuel suppliers, which have limited options for reducing GHG emissions through their operations, may opt to continue purchasing allowances or offsets as a less costly alternative to installing upgrades.

(b) Extend Most Allowance Allocation Beyond 2020 ~~and Incorporate Results of Leakage Studies for Post-2020 Allowance Allocation~~

The Post-2020 Cap-and-Trade Program approved by the Board will~~may~~ include post-2020 allocation for ~~industrial entities,~~ electrical distribution utilities, natural gas suppliers, public wholesale water agencies, ~~legacy contract generators with industrial counterparties,~~ universities, and public service facilities; updates to industry assistance factors for a post-2020 program; and targeted updates to product-based emissions efficiency benchmarks (Table 9-1 in the Regulation) for the third compliance period. ~~These updates may be part of a 15-day comment period for the Proposed 2016 Cap-and-Trade Amendments.~~[6] Additional details on the development of the~~a proposed~~ methodology to allocate allowances to electrical distribution utilities, potential increased

[6] The Board's Resolution 17-21 also indicates a commitment to propose regulatory amendments related to legacy contract allocation no later than the allocation of vintage 2021 allowances, as well as additional third compliance period allocation for industrial assistance factors. Cap-and-Trade 2016 documents available at https://www.arb.ca.gov/regact/2016/capandtrade16/capandtrade16.htm

consignment of natural gas supplier allocated allowances, ~~a proposed methodology to incorporate the results of leakage studies to inform allowance allocation,~~ and the discussion of updates to product-based benchmarks may be found in the Staff Report for Proposed 2016 Cap-and-Trade Amendments. Further, recently enacted AB 398 provides specific direction to CARB on what the post-2020 assistance factors will be. Specifically, the bill directs CARB to set industry assistance factors for allowance allocation commencing in 2021 at the levels applicable in the compliance period of 2015 to 2017, inclusive, with a declining cap adjustment factor to the industry allocation equivalent to the overall statewide emissions declining cap using the methodology from the compliance period of 2015 to 2017, inclusive.

Reasonably Foreseeable Compliance Responses

Methodologies, assistance factors, and product-based benchmarks used to calculate free allowance allocation may increase, decrease, or remain the same depending on the implementation of post-2020 allocation methodologies. Changes in methodologies, assistance factors, and product-based benchmarks will change the amount of freely allocated allowances received by covered entities. Covered entities in sectors experiencing a decrease in free allowance allocation are expected to respond by acquiring more compliance instruments at auction and by trading, and by more aggressively pursuing GHG emissions reductions through reducing fuel use, changing fuels, upgrading equipment, and other efficiency improvements that have been previously mentioned. Covered entities in sectors experiencing an increase in free allowance allocation are likely to respond by similar activities, but in a less aggressive manner. While any post-2020 allocation changes could alter the amount of free allowances required by covered entities to minimize leakage, no changes to types of compliance responses are anticipated. However, depending on amounts of free allowance allocations, the magnitude of compliance activities undertaken by covered entities to meet the cap may vary.

(c) Linkage with Ontario, Canada

As part of the Board's July 27, 2017 approval of amendments to the Cap-and-Trade Regulation, the Board approved (following the Governor's issuance of SB 1018 linkage findings referenced below) linkage with Ontario's Cap-and-Trade Program, to be effective on January 1, 2018. ~~The Post-2020 Cap-and-Trade Program includes a framework for linkage to the~~ The Ontario, Canada market, was~~which is currently under development~~ developed for linkage with the Western Climate Initiative (WCI) regional market. WCI is a collaboration among states and provinces that was initiated in 2007 to address climate change at a regional level. Within WCI, the three jurisdictions of California, Québec, and Ontario collaborated on the development of cap-and-trade program-design recommendations, providing a roadmap for program implementation and harmonization. California's Cap-and-Trade Program was developed concurrently with the WCI design documents that provide a template for a regional cap-and-trade program. The similar design features and minimum stringency requirements drawn from

the WCI process facilitate linkage among the California, Québec, and Ontario, Canada programs.

SB 1018 (Gov. Code, §§ 12894(f) and (g)) requires that the Governor make four findings prior to linking the California Program with other jurisdictions. Under SB 1018, the Governor must find:

- The jurisdiction with which the state agency proposes to link has adopted program requirements for greenhouse gas reductions, including but not limited to, requirements for offsets, that are equivalent to or stricter than those required by the California Global Warming Solutions Act of 2006 (Division 25.5 of the Health and Safety Code §38500-38599).

- Under the proposed linkage, the State of California is able to enforce California Global Warming Solutions Act of 2006 (Division 25.5 of the Health and Safety Code §38500-38599) and related statues, against any entity subject to regulation under those statutes, and against any entity located within the linking jurisdiction to the maximum extent permitted under the United States' and California's Constitutions.

- The proposed linkage provides for enforcement of applicable laws by the state agency or by the linking jurisdiction of program requirements that are equivalent to or stricter than those required by California Global Warming Solutions Act of 2006 (Division 25.5 of the Health and Safety Code §38500-38599).

- The proposed linkage and any related participation of the State of California in WCI, Incorporated, shall not impose any significant liability on the state or any state agency for any failure associated with the linkage

Linkage with Ontario, Canada ~~would~~ allows for acceptance of offset credits both from allowances and offset projects. Additional details on the development of ~~proposed~~ recently approved regulatory amendments for linkage with Ontario, Canada may be found in the Staff Report for Proposed 2016 Cap-and-Trade Amendments and on the Cap-and-Trade rulemaking webpage at https://www.arb.ca.gov/regact/2016/capandtrade16/capandtrade16.htm.

Reasonably Foreseeable Compliance Responses

Linkage with Ontario, Canada does not authorize implementation of Ontario's Cap-and-Trade Program. CARB lacks jurisdiction to implement any part of Ontario's Cap-and-Trade Program beyond the linkage included as part of the Proposed 2016 Cap-and-Trade Amendments. Therefore, covered entity compliance obligations under Ontario's Cap-and-Trade Program exist independently of CARB's proposal. Any environmental effects resulting from covered entity compliance obligations under Ontario's Cap-and-Trade Program are therefore not attributable to CARB's proposal. However, for

purposes of disclosure, CARB provides information in Section 2.B and Section ~~2.C.7~~ 2.D.3 of the Final~~Draft~~ EA prepared for the 2016 Cap-and-Trade Amendments regarding the potential compliance responses resulting from linkage with Ontario, Canada including development of Canadian offset projects. Currently Ontario, Canada is considering three offset protocols that would consist of mine methane, ozone depleting substance (ODS), and landfill gas projects.

(d) Streamline Implementation of the Cap-and-Trade Program

~~Proposed~~ The recently approved amendments to the Cap-and-Trade Program include streamlining implementation of the Compliance Offsets Program, auctions, and the management of information submitted pursuant to the Regulation.

These~~Proposed~~ amendments to the Cap-and-Trade Program requirements for the Compliance Offsets Program include modifications or clarifications to the timeline for offset credit issuance, clarifications regarding determining periods of regulatory noncompliance for the MMC and Livestock Protocols, and other changes related to the implementation of the Program.

~~Proposed~~They also include ~~amendments to the Cap-and-Trade Program requirements for auctions include~~ opportunities for streamlining auctions by removing the requirement to submit notification of intent to bid and streamlining financial settlement by reducing the bid guarantee options to ensure cash payment upon certification of auction and allowing bid guarantees to be maintained.

The Cap-and-Trade Program ~~currently~~ requires information to be submitted to CARB including user registration, entity registration (Compliance Instrument Tracking System Service [CITSS] account application), publicly owned electrical distribution utilities or electrical cooperatives allowance allocation to compliance account or limited use holding account, reporting on use of electrical distribution utility allocated allowance value, and transfer request information.

The recently approved amendments~~Proposed approaches to~~ streamline~~ing~~ the management of submitted information ~~include~~ by allowing electronic reporting and signature of required information, including attestations. This includes the potential for developing mechanisms for the online submission of entity information not currently reported in CITSS to replace hardcopy forms and developing online submission for publicly owned electrical distribution utilities and electrical cooperatives designation of allowance allocation to Compliance Account or Limited Use Holding Account. The Regulation sections referencing the timing and content of disclosure updates for corporate associations ~~would be~~ have been consolidated, and timeframes for updating corporate association changes ~~would be~~ have been modified to increase consistency.

Reasonably Foreseeable Compliance Responses

These amendments are largely administrative in nature; therefore, they would not affect previously evaluated compliance responses for covered sectors. The ~~proposed~~ amendments pertaining to determining periods of regulatory noncompliance for projects developed under the MMC and Livestock Protocols would not alter the previously analyzed compliance responses. The ~~proposed~~ changes ~~would~~ more specifically delineate periods of regulatory noncompliance, while continuing to prohibit issuance of offset credits for time periods when an offset project is not in regulatory compliance as set forth in the 2016 Cap-and-Trade documents.

(e) Ensure Compliance Obligations are Accurately Assessed for Imported Electricity

CARB and CAISO continue to work to ensure GHG emissions associated with imports through CAISO markets to serve California load are accurately identified. The recently approved ~~proposed~~ regulatory amendments represent an initial option that was developed by CAISO. ~~CARB and CAISO are coordinating with stakeholders to refine the proposed solution for the GHG accounting issue and are soliciting options for alternatives.~~ The ~~Proposed~~ approved amendments ~~Project includes regulatory amendments designed to~~ ensure these GHG emissions are accounted for by retiring unsold allowances in the amount of the outstanding emissions that are underreported to CARB~~and assigned as a compliance obligation to those entities serving California load whose actions cause those emissions~~. ~~As currently proposed, the amendments include a mechanism to apportion compliance obligations for the unaccounted for GHG emissions associated with increased power generation to serve California load to power importers, which are serving California load by purchases from the Energy Imbalance Market (EIM), in addition to the compliance obligations currently imposed on EIM importers.~~

Reasonably Foreseeable Compliance Responses

Since any outstanding emissions would be met by retiring allowances from those that remain unsold at auction, entities will not face any immediate additional compliance obligation, so no additional compliance responses are foreseen in the immediate future. CAISO and CARB continue to coordinate with stakeholders to refine the solution for the GHG accounting issue. ~~Entities faced with additional compliance obligations as a result of the proposed amendments would likely seek to reduce these obligations by seeking to purchase from renewable sources or lower carbon sources where possible. This may create market incentives for operators of generation sources selling into the California market to reduce emissions by improving plant efficiency or developing more renewable power. However, the most likely near-term compliance response is the purchase of allowances or offsets to meet surrender obligations.~~

~~g) 20 Percent Reduction in GHGs at Refineries~~

~~i. Description of Measures~~

~~A new regulation for a 20 percent GHG reduction for the refinery sector would require all refineries, by 2030, to achieve the efficiency of the most efficient existing refinery on a simple barrel, or other metric, basis. This regulation would not limit mass GHG emissions through the use of hard caps on total mass emissions from facilities, but would require facilities to become more efficient through any combination of actions such as fuel switching, boiler electrification, onsite investments in newer more energy efficient technologies, use of lighter crude slates, and any other process efficiencies that would be identified in consultation with local air districts and CARB.~~

~~One initial implementation step for this new industrial sector strategy would be for the State to partner with California's local air pollution control and air quality management districts (air districts), which traditionally permit these facilities for criteria pollutants and toxic air contaminants. Together, the State and local air districts could identify efficiency improvement opportunities for stationary source combustion equipment that target criteria and toxic emissions reductions with consideration of GHG benefits. This strategy would be prioritized for all refinery facilities subject to the Energy Efficiency Audit in the areas where Best Available Retrofit Control Technology (BARCT) requirements are applicable.~~

~~ii. Reasonably Foreseeable Compliance Responses~~

~~Reductions in GHG emissions at refineries would be implemented through the existing air district BARCT/All Feasible Measures process, as well as driven by the potential new CARB regulation. The BARCT determinations also promote consistency of controls for similar emission sources among districts with the same air quality attainment designations. BARCT/All Feasible Measures would be required to demonstrate reductions of criteria pollutants and would account for GHG reductions. Actions taken in response to the proposed CARB regulation would likely result in similar controls. Examples of possible BARCT/All Feasible Measures controls, which might also reasonably be expected to be driven by CARB efficiency rules, include:~~

- ~~energy efficiency standards for larger combustion equipment;~~
- ~~mandatory equipment replacement requirements;~~
- ~~installation of new and emerging technologies;~~
- ~~heat rate improvement projects;~~
- ~~installation of electronic controls;~~
- ~~installation of waste heat recovery systems; and~~
- ~~optimization study and implementation.~~

~~Modifications to existing facilities would occur within the footprint of individual sites.~~

~~In addition to the efficiency actions listed above, an CARB regulation could include GHG reductions driven by process equipment fuel switching from fossil natural gas to renewable natural gas (RNG), or switching to processing of lighter crudes using existing and/or updated equipment processes.~~

D. Summary of Reasonably Foreseeable Compliance Responses to the ~~Proposed~~Scoping Plan Measures

Implementation of the measures to achieve the 2030 target in the ~~Proposed~~Scoping Plan would result in two main types of reasonably foreseeable compliance responses: 1) construction of, or modifications to buildings, infrastructure, and industrial facilities; and, 2) new operations or changes to existing operational processes. These types of compliance responses are summarized as follows and form the basis for the evaluation in the impact analysis in Chapter 4 of this Final~~Draft~~ EA.

1. Construction of, or Modifications to, Buildings, Infrastructure, and Industrial Facilities

Implementation of the ~~Proposed~~Scoping Plan would result in various construction projects. These projects would include infrastructure projects, such as natural gas and hydrogen refueling stations; collection, processing, and distribution of biomethane; wind, solar thermal, solar photovoltaic, geothermal, solid-fuel biomass, biogas, and small hydroelectric to generate electricity (i.e., renewable energy projects); collection of natural gas from landfills, dairies, and wastewater treatment plants; modifications to crude production facilities (onsite solar, wind, heat, and/or steam generation electricity); organic material composting and/or digesting facilities that would convert organic wastes diverted from landfills (e.g., yard waste, green wastes, food); vehicle fueling (e.g. renewable natural gas); vehicle charging stations; and upgraded and new transmission lines. Modifications may also be necessary at: industrial sources in compliance with the Cap-and-Trade Program (see above for more detailed descriptions); roadways and urban areas to reduce overall VMT; and oil and gas facilities (which may include modifications to existing facilities, pipeline replacement or reconstruction activities, inspection and monitoring, and disposal of methane vapors). In addition, manufacturing facilities may be necessary to produce lithium batteries. Large-scale energy storage systems would also be installed throughout California, which would reduce energy production demands.

Construction activities could require disturbance of undeveloped area, such as clearing of vegetation, earth movement and grading, trenching for utility lines, erection of new buildings, and paving of parking lots, delivery areas, and roadways. Demolition of existing structures may also occur before the construction of new buildings and structures. Construction activities can be short-term and long-term. That is, after construction of a building is completed, it will stay on a project site until demolished or otherwise removed.

2. New Operations and Changes to Existing Operational Processes

Under the ~~Proposed~~Scoping Plan there would be various methods to reduce GHG emissions that would result in new operations or changes to existing operational processes. New operations could include increased mining for lithium and increased recycling or refurbishment of batteries for on-road light-duty and heavy-duty vehicles. New operations would also include changes to methods of manure management at dairies, alterations to crop cultivation to meet feedstock demands related to fuels regulations, and improvements to transportation systems to reduce reliance on personal vehicles. In addition, offset protocols related to the Cap-and Trade Program would alter activities at mines, agricultural operations, landfills, and U.S. forests. Linkage to Ontario and extension of the Cap-and-Trade Program could increase demand for offsets and increased compliance response activities for covered entities in Canada and the U.S (see above for more detailed descriptions). New operations and changes to existing operational processes are considered to occur over a long period of time (i.e., for the foreseeable future).

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3.0 ENVIRONMENTAL AND REGULATORY SETTING

The California Environmental Quality Act (CEQA) Guidelines require an environmental impact report (EIR) to include an environmental setting section, which discusses the current environmental conditions in the vicinity of the project. This environmental setting constitutes the baseline physical conditions against which an impact is normally compared to determine whether or not it is significant. (Cal. Code Regs., tit. 14 § 15125.) As discussed above in Chapter 1, the California Air Resources Board (CARB or Board) has a certified regulatory program and prepares an environmental analysis (EA) in lieu of an EIR. This FinalDraft EA is a functional equivalent to an EIR under CEQA. Therefore, in an effort to comply with the policy objectives of CEQA, an environmental setting, as well as a regulatory setting with relevant environmental laws and regulations, has been included as Attachment A to this document.

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4.0 IMPACTS ANALYSIS AND MITIGATION MEASURES

A. Approach to the Environmental Impacts and Mitigation Measures

This chapter contains an analysis of the environmental impacts resulting from implementation of the Proposed Strategy for Achieving California's 2030 Greenhouse Gas Target (~~Proposed~~Scoping Plan). The California Environmental Quality Act (CEQA) requires the baseline for determining the significance of environmental impacts to normally be the existing conditions at the time the environmental review is initiated. (Cal. Code Regs., tit.14, § 15125(a).) Therefore, significance determinations reflected in this Final~~Draft~~ Environmental Analysis (EA) are based on a comparison of the potential environmental consequences of implementation of measures in the ~~Proposed~~Scoping Plan with the regulatory setting and physical conditions in 2016 (see Attachment A).

1. Significant Adverse Environmental Impacts and Mitigation Measures

The analysis of adverse impacts on the environment, and significance determinations for those impacts, reflect the programmatic nature of the analysis of the reasonably foreseeable compliance responses to implementation of the measures in the ~~Proposed~~Scoping Plan. These reasonably foreseeable compliance responses are described in more detail in Chapter 2, which include broadly-defined types of actions that may be taken by others in the future as a result of implementation of the measures in the ~~Proposed~~Scoping Plan.

This Final~~Draft~~ EA takes a conservative approach and considers some adverse environmental impacts to be potentially significant because of the inherent uncertainties about the ultimate design or implementation details of the recommended measures. The relationship between reasonably foreseeable physical actions carried out in response to implementation of the measures, as well as environmentally sensitive resources or condition that may be affected, are also taken into consideration.

If and when specific measures identified in the ~~Proposed~~Scoping Plan are proposed to be carried out by CARB or others, such as a proposed regulation, that proposal would, as applicable, be subject to more detailed, measure-specific environmental review. CARB expects that, at that stage of a specific proposal, it will have more information about programmatic design options and the ability to make decisions about any regulatory requirements that can be included to avoid some potentially significant impacts. This is especially the case for any potential long-term air quality impacts that are identified at this stage of programmatic review because air quality is within CARB's jurisdiction, and CARB is more likely to be able to address these types of issues through the specific regulation or program design. CARB has continuing duties under its authorizing statutes and under Assembly Bill (AB) 32, Senate Bill (SB) 32 and Assembly Bill (AB) 197 to ensure that measures it adopts and manages do not interfere with the State's progress towards attainment with public health standards, with a focus on health effects in disadvantaged communities. CARB strives to ensure that funding decisions

are consistent with these core commitments as well. Therefore, CARB staff can be expected to design and implement measures identified in this ~~Proposed~~Scoping Plan within CARB's jurisdiction in ways that protect and enhance air quality and avoid other adverse environmental effects to the greatest extent possible.

For later actions carried out by others in response to implementation of measures (e.g., construction of new facilities), it is expected that, during project level environmental review, many impacts identified in this Final~~Draft~~ EA can be avoided or reduced to a less-than-significant level by local permitting authorities. Nonetheless, at this stage, this Final~~Draft~~ EA takes a conservative approach in its post-mitigation significance conclusions, to avoid any risk of understating the impact, considering the current uncertainty as to how specific measures will be implemented and whether feasible mitigation would be sufficient or would be implemented by other parties. This approach fulfills CARB's disclosure responsibility under CEQA by noting that potentially significant environmental impacts may be unavoidable.

Where applicable, consistent with CARB's certified regulatory program requirements (Cal. Code Regs., tit.17, § 60005 (b)), this Final~~Draft~~ EA also acknowledges potential beneficial impacts on the environment in each resource area that may result from implementation of the ~~Proposed~~Scoping Plan. Any beneficial impacts associated with the ~~Proposed~~Scoping Plan are included in the impact assessment for each resource area described in this chapter.

B. Resource Area Impacts and Mitigation Measures

Below is a programmatic analysis of the impacts resulting from reasonably foreseeable compliance responses to implementation of the ~~Proposed~~Scoping Plan. The reasonably foreseeable compliance responses are analyzed in a programmatic manner under each resource area for several reasons:

(1) any individual action or activity would be carried out under the same overall program (i.e., implementation of the measures contained in the ~~Proposed~~Scoping Plan);

(2) the reasonably foreseeable compliance response would result in generally similar environmental effects that can be mitigated in similar ways (Cal. Code Regs., tit.14, § 15168 (a)(4)); and,

(3) while the types of foreseeable compliance responses can be reasonably predicted, the specific location, design, and setting of the potential actions cannot feasibly be known at this time.

If a later activity would have environmental impacts that are not examined within this Final~~Draft~~ EA, the public agency with authority over the later activity would be required to conduct additional environmental review as required by CEQA or other applicable statutes.

The analysis of the impacts resulting from the recommended measures is organized to describe construction-related impacts and operational impacts within each environmental resource area. Please refer back to Chapter 2 for the detailed description of the recommended measures and the reasonably foreseeable compliance responses associated with those measures. Only those compliance responses that could lead to environmental impacts within that resource area are discussed, unless there is a need to demonstrate that no impact to that resource area would occur (e.g., it is not obvious by the compliance responses discussed in Chapter 2). As appropriate, individual measures are discussed under their own subheading to portray certain reasonably foreseeable compliance responses (e.g., increased construction and operation of renewable energy projects). Removal of the refinery measure is not expected to forgo any GHG emissions reductions previously analyzed, as those emissions are still covered by the Cap-and-Trade Program which is now anticipated, consistent with AB 398 direction, to deliver a greater share of reductions needed to achieve the 2030 target.

When an impact is determined to be potentially significant, mitigation measures are described. In some cases, several mitigation measures are provided to reduce the severity or avoid potentially significant environmental impacts. These potential mitigation measures correspond to subheadings provided in the impact analysis text. For instance, under Impact 2.b, Operational Impacts to Agricultural and Forest Resources, impacts related to the Low Carbon Fuel Standard (LCFS) measures are described under a subheading labeled as, “ii. LCFS Measures;” and, the corresponding mitigation measure is listed as “Mitigation Measure 2.b.ii.”

1. Aesthetics

a) Impact 1.a: Construction-Related Impacts to Aesthetics

As summarized in Chapter 2, section D.1, the reasonably foreseeable compliance responses associated with the ~~Proposed~~Scoping Plan would require construction activities. These impacts address the building phase of both reasonably foreseeable construction of new facilities or modification of existing facilities that involve earth-moving activities.

Landscape character can be defined as the visual and cultural image of a geographic area. It consists of the combination of physical, biological, and cultural attributes that make each landscape identifiable or unique. Visual character may range from predominately natural to heavily influenced by human development. Its value is related, in part, to the importance of a site to those who view it. Viewer groups typically include: residents, motorists, and recreation users.

Although it is reasonably foreseeable that activities associated with construction of new facilities or modification of existing facilities could occur due to implementation of the various ~~Proposed~~Scoping Plan measures, there is uncertainty as to the exact location or character of any new facilities or modification of existing facilities. Some of the

reasonably foreseeable compliance responses could be accomplished with minimal ground-disturbing activity. For instance, increased recycling and refurbishment of lithium batteries could be performed within existing recycling centers that undergo internal retrofitting. The outward appearance of facilities that undergo internal retrofitting would not require physical modifications that could degrade the visual character or quality of the surrounding area. Thus, visual impacts would not be substantial in these cases.

Construction of new facilities, although expected to occur in areas appropriately zoned, could conceivably introduce or increase the presence of visible artificial elements (e.g., heavy-duty equipment, vegetation removal, new or expanded buildings) in areas of scenic importance, such as visibility from a State scenic highway. The visual effects of such construction would depend on several variables, including the type and size of facilities, distance and angle of view, visual prominence, and placement in the landscape. In addition, nighttime lighting for safety and security purposes may be necessary during the construction phase of projects, which could affect nighttime view.

Impact Significance Determination

For the reasons described above, construction-related impacts on aesthetics associated with implementation of the ~~Proposed~~Scoping Plan could be potentially significant.

Mitigation Measures

Potential aesthetic impacts could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

Mitigation Measure 1.a:

The Regulatory Setting in Attachment A includes applicable laws and regulations that provide protection of aesthetic resources. CARB does not have the authority to require implementation of mitigation related to new or modified facilities or infrastructure that would be approved by other State agencies or local jurisdictions. The ability to require such measures is within the purview of jurisdictions with land use approval and/or permitting authority. Project-specific impacts and mitigation would be identified during the project review process carried out by agencies with approval authority. Recognized practices routinely required to avoid and/or minimize impacts to aesthetic resources include:

- Proponents of new or modified facilities, or infrastructure constructed because of reasonably foreseeable compliance responses, would coordinate with State or local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local or State land use agency or governing body must follow all applicable environmental regulations as part of approval of a project for development.

- Based on the results of the environmental review, proponents would implement all feasible mitigation to reduce or substantially lessen the potentially significant scenic or aesthetic impacts of the project.

- The project proponent would color and finish the surfaces of all project structures and buildings visible to the public to: (1) minimize visual intrusion and contrast by blending with the landscape; (2) minimize glare; and (3) comply with local design policies and ordinances. The project proponent would submit a surface treatment plan to the lead agency for review and approval.

- To the extent feasible, the sites selected for use as construction staging and laydown areas would be areas that are already disturbed and/or are in locations of low visual sensitivity. Where feasible, construction staging and laydown areas for equipment, personal vehicles, and material storage would be sited to take advantage of natural screening opportunities provided by existing structures, topography, and/or vegetation. Temporary visual screens would be used where helpful, if existing landscape features did not screen views of the areas.

- All construction, operation, and maintenance areas would be kept clean and tidy, including the re-vegetation of disturbed soil and storage of construction materials and equipment would be screened from view and/or are generally not visible to the public, where feasible.

- Siting projects and their associated elements next to important scenic landscape features or in a setting for observation from State scenic highways, national historic sites, national trails, and cultural resources would be avoided to the greatest extent feasible.

- The project proponent would contact the lead agency to discuss the documentation required in a lighting mitigation plan, submit to the lead agency a plan describing the measures that demonstrate compliance with lighting requirements, and notify the lead agency that the lighting has been completed and is ready for inspection.

Post-Mitigation Significance Determination

Because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this Final~~Draft~~ EA does not attempt to address project-specific details of mitigation, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant scenic and nighttime lighting impacts.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this Final~~Draft~~ EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that construction-related aesthetic impacts associated with measures under the ~~Proposed~~Scoping Plan would be **potentially significant and unavoidable**.

b) Impact 1.b: Operational Impacts to Aesthetics

As summarized in Chapter 2, section D.2, the reasonably foreseeable compliance responses associated with the ~~Proposed~~Scoping Plan would require long-term operational changes. These operational changes are related to implementation of offset protocols associated with the Cap-and-Trade, new renewable energy projects associated with renewable energy and energy efficiency, including SB 350 measures and LCFS, and the presence of new facilities and changes to the existing environment associated with all measures.

i. New Facilities

As described above, development of new facilities, although expected to occur in areas appropriately zoned, could conceivably introduce or increase the presence of visible artificial elements (e.g., heavy-duty equipment, vegetation removal, new or expanded buildings) in areas of scenic importance, such as visibility from a State scenic highway. The visual effects of such development would depend on several variables, including the type and size of facilities, distance and angle of view, visual prominence, and placement in the landscape. In addition, facility operation may introduce substantial sources of glare, exhaust plumes, and nighttime lighting for safety and security purposes.

ii. Renewable Energy and Energy Efficiency, Including SB 350 and LCFS Measures

Implementation of renewable energy and energy efficiency, including SB 350 measures and increased stringency of LCFS would increase the number of renewable energy projects. Renewable energy supplies include: wind, solar thermal, solar photovoltaic, geothermal, solid-fuel biomass, biogas, and small hydroelectric systems. Depending on the size and location of these types of systems, operations may affect the quality of scenic vistas and damage scenic resources. The operation of wind, solar thermal, and solar photovoltaic energy would occur over large expanses of land (i.e., acres). These types of facilities generally consist of the following features.

- Wind development would introduce into the visual environment large, vertical towers, turbines with revolving turbine blades, access roads, transmission lines, substations, rights-of-way, and other associated facilities.

- Operation of solar thermal facilities may create substantial sources of light or glare due to certain project components, including power towers, and parabolic dishes and troughs. The levels of light and glare may dominate the landscape, which in some cases, may include minimal or no existing lighting.

These facilities would also require the use of nighttime lighting for safety and security reasons, which may also result in glare.

- Development of solar photovoltaic energy would occur in various locations throughout the State. Solar photovoltaic installations may create new sources of substantial light or glare, thereby affecting day and nighttime views. Levels of light or glare may dominate the project landscape. These facilities would also require the use of nighttime lighting for safety and security reasons, which may also result in glare. Depending on specific locations of development, the views of motorists, residents, and recreationists may be affected.

Operation of geothermal, solid-fuel biomass, biogas, and small hydroelectric power generation facilities would not present the large areas of land required for wind- and solar-based facilities and would generally appear as buildings (see Impact 1.a for a description of these types of impacts). However, operation of these facilities could require nighttime lighting for operational safety and security and glare from night lighting may also occur. Glare from the surfaces of geothermal project facilities during the day may also occur.

iii. Cap-and-Trade Measure

Under the post-2020 Cap-and-Trade Offset Protocols, eligible offset credits would be generated through projects that are in conformance with all applicable environmental, health, and safety regulations. The Offset projects conducted under the ozone depleting substance (ODS) Offset Protocol would occur at existing destruction facilities; therefore, would not be expected to introduce activities that would disrupt aesthetic or visual settings. Implementation of the Livestock Offset Protocol would include operation of digesters in agricultural settings. Digesters are consistent with agricultural uses (i.e., structural aspects of farms) and would not represent a substantial adverse change to the visual character of the vicinity. The U.S. Forest Offset Protocol would not increase the amount of forest activities, but could result in activities that increase carbon sequestration, such as less intensive harvesting and increased rotation lengths. This shift may change the visual character of offset project sites over time, but would not pose an adverse visual impact. Managing forests to increase cover and remove dead and diseased trees may be a visually beneficial effect. Implementation of the Urban Forest Offset Protocol would improve the quality of the urban visual environment and would be considered aesthetically beneficial (CARB 2010). Implementation of the Rice Cultivation Protocol would alter flooding and draining patterns in rice fields, but would not substantially alter the visual character of rice farms (CARB 2014a).

Implementation of the mine methane capture projects may result in the operation of gas extraction, capture, transportation, processing, destruction, and monitoring equipment at existing active or abandoned mine sites. The installed equipment is likely to be of similar size, scale, and visual character to those typical of mining operations. However, abandoned mining sites and adjacent areas may have been subject to varying degrees of reclamation, reuse, and/or redevelopment since mine closure and abandonment.

Operation of offset projects at abandoned mining sites could thus alter the visual character of such sites and adjacent surrounding areas, or introduce new sources of nighttime lighting that could adversely affect surrounding areas that may have been restored for active public recreation or uses other than mining.

Under the Mine Methane Capture (MMC) Protocol EA, compliance with relevant and applicable laws and regulations (e.g., Surface Mining Control and Reclamation Act [SMCRA]) would reduce the potential for conflicts with forest management, agricultural activities, or other existing land uses on affected reclaimed mining lands, and thus, aesthetic impacts would not be substantial (CARB 2013).

The reasonably foreseeable compliance responses and impacts associated with implementation of offset protocols in Canada would be similar to those described above for mine methane capture and ODS projects. As discussed, there would not be substantial impacts related to ODS projects. Implementation of landfill projects in Ontario would involve the operation of gas collection and control systems, which would not adversely affect the visual character of existing landfill sites. However, the noted regulations that would reduce the severity of impacts associated with mine methane capture projects, described above, do not apply to areas within Canada, and have authority only in areas within the United States, including California. While Canadian federal, provincial, and municipal environmental laws contain some requirements like those associated with SMCRA, it is unknown where and under which jurisdiction individual projects may be located. Thus, the authority to determine project-level impacts and applicable regulations lies with the permitting agency for individual projects. Further, the programmatic analysis does not allow project-specific details of mitigation, resulting in an inherent uncertainty in the degree of mitigation that would ultimately be implemented to reduce the potentially significant impacts. Thus, aesthetics impacts could be substantial related to implementation of mine methane capture offset projects in Canada.

Impact Significance Determination

For the reasons discussed above, operational aesthetic impacts could be potentially significant due to the presence and operations of new facilities and structures, and implementation of the reasonably foreseeable compliance responses associated with Cap-and-Trade offset protocols in Canada.

Mitigation Measures

Mitigation Measure 1.b.i: Implement Mitigation Measure 1.a

Mitigation Measure 1.b.ii: Implement Mitigation Measure 1.a

Mitigation Measure 1.b.iii:

As described above, operational impacts related to mine methane offset protocol projects would be reduced to a less-than-significant level through implementation of existing regulations, including SMCRA, the Clean Water Act, and the Soil and Water

Resources Conservation Act. The U.S. federal government and CARB lack the authority to propose or implement these, or similar laws. Thus, the authority to determine project-level impacts and applicable regulations lies with the permitting agency for individual projects. Further, the programmatic analysis does not allow project-specific details of mitigation, resulting in an inherent uncertainty in the degree of mitigation ultimately implemented to reduce the potentially significant impacts. As a result, no mitigation is available to reduce potentially significant impacts related to mine methane offset projects in Canada.

Post-Mitigation Significance Determination

Because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this Final~~Draft~~ EA does not attempt to address project-specific details of mitigation, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant scenic and nighttime lighting impacts.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this Final~~Draft~~ EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that operational aesthetic impacts associated with all measures under the ~~Proposed~~Scoping Plan would be **potentially significant and unavoidable**.

2. Agricultural and Forest Resources

a) Impact 2.a: Construction-Related Impacts to Agricultural and Forest Resources

As summarized in Chapter 2, section D.1, the reasonably foreseeable compliance responses associated with the ~~Proposed~~Scoping Plan would require construction activities. These impacts address the building phase of both reasonably foreseeable construction of new facilities or modification of existing facilities that involve earth-moving activities.

If facilities or transportation improvements are proposed in response to the ~~Proposed~~Scoping Plan, potential impacts to Prime Farmland, Unique Farmland, Farmland of Statewide Importance, Williamson Act conservation contracts, forest land or timberland, must be reviewed by local or State lead agencies in the context of future project approvals. Many local governments have adopted land use policies to protect important agricultural and forest land from conversion to urban development, including industrial facilities. While it is reasonable to anticipate that land use policies controlling the location of new industrial facilities would generally avoid conversion of important agricultural land, the potential cannot be entirely dismissed. If a facility were located on important farmland or property under a Williamson Act Contract, conversion of the agricultural land to urban uses could occur.

Implementation of renewable energy and energy efficiency, including SB 350 measures and increased stringency of LCFS would increase the number of renewable energy projects. In response to proposals for development of renewable energy projects on important farmland, local governments and State Agencies have faced the challenge of balancing competing public interests in conserving agricultural land and meeting goals for expanding renewable energy generation. Utility-scale solar and wind energy facilities proposed to be located on Important Farmland and/or property under Land Conservation (Williamson Act) contracts have resulted in land use conversions. In 2013, a California appellate court upheld an EIR's evaluation of agricultural land impact and mitigation for a proposed solar project on grazing land and Williamson Act contract land where a contract cancellation was proposed. The mitigation measures adopted by the lead agency in the case included agricultural conservation easements and measures to restore the site after conclusion of the project's useful life. The Court decision confirmed that it was appropriate for the local lead agency to consider the State's interest in increasing renewable energy generation as a reason to permit the cancellation of a Williamson Act contract. (Save Panoche Valley v. San Benito County (2013) 217 Cal.App.4th 503.) Consequently, conversion of important farmland could occur in response to the measures in the ~~Proposed~~Scoping Plan. Because CARB has no land use authority, mitigation is not within its purview to reduce potentially significant impacts to less-than-significant levels. While compliance with existing land use policies, ordinances, and regulations would serve to moderate this impact, because of local priorities for protection of agricultural land, the record of recent project approvals in the State demonstrates the impact has not been avoided.

Impact Significance Determination

For the reasons described above, construction-related impacts on agricultural and forest resources associated with implementation of the ~~Proposed~~Scoping Plan could be potentially significant.

Mitigation Measures

Potential construction-related impacts to agricultural and forest resources could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

Mitigation Measure 2.a:

The Regulatory Setting in Attachment A includes applicable laws and regulations that provide protection of agricultural and forest resources. CARB does not have the authority to require implementation of mitigation related to new or modified facilities or infrastructure that would be approved by other State agencies or local jurisdictions. The ability to require such measures is within the purview of jurisdictions with land use approval and/or permitting authority. Project-specific impacts and mitigation would be identified during the project review process and carried out by agencies with approval

authority. Recognized practices routinely required to avoid and/or minimize impacts to agriculture and forest resources include:

- Proponents of new or modified facilities, or infrastructure constructed because of reasonably foreseeable compliance responses, would coordinate with State or local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local or State land use agency or governing body must follow all applicable environmental regulations as part of approval of a project for development.

- Based on the results of the environmental review, proponents would implement all feasible mitigation to reduce or substantially lessen the environmental impacts of the project. Because CARB has no land use authority, mitigation is not within its purview to reduce potentially significant impacts to less-than-significant levels. Any mitigation specifically required for a new or modified facility would be determined by the local lead agency and future environmental documents by local and State lead agencies should include analysis of the following:

    - Avoidance of lands designated as Important Farmlands (State defined Prime Farmland, Farmland of Statewide Importance, and Unique Farmland) as defined by the Farmland Mapping and Monitoring Program.

    - Analysis of the feasibility of using farmland that is not designated as Important Farmland prior to deciding on the conversion of Important Farmland.

    - The feasibility, proximity, and value of the proposed project sites should be balanced before a decision is made to locate a facility on land designated as Important Farmland.

    - Any action resulting in the conversion of Important Farmlands should consider mitigation for the loss of such farmland. Any such mitigation should be completed prior to the issuance of a grading or building permit by providing the permitting agency with written evidence of completion of the mitigation. Mitigation may include but is not limited to:

        - Permanent preservation of off-site Important Farmland (State defined Prime Farmland, Farmland of Statewide Importance, and Unique Farmland) of equal or better agricultural quality, at a ratio of at least 1:1.

        - Preservation may include the purchase of agricultural conservation easement(s); purchase of credits from an established agricultural

farmland mitigation bank; contribution of agricultural land or equivalent funding to an organization that provides for the preservation of farmland towards the ultimate purchase of an agricultural conservation easement.

- Participation in any agricultural land mitigation program, including local government maintained, that provides equal or more effective mitigation than the measures listed.

Post-Mitigation Significance Determination

Because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this Final~~Draft~~ EA does not attempt to address project-specific details of mitigation, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts to agricultural and forest resources.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this Final~~Draft~~ EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that construction-related impacts to agricultural and forest resources associated with the ~~Proposed~~Scoping Plan would be **potentially significant and unavoidable**.

b) Impact 2.b: Operational Impacts to Agriculture and Forest

As summarized in Chapter 2, section D.2, the reasonably foreseeable compliance responses associated with the ~~Proposed~~Scoping Plan could require long-term operational changes. These operational changes are related to implementation of offset protocols associated with the Cap-and-Trade Program, and land use changes related to more stringent requirements under the LCFS regulation.

i. Cap-and-Trade Measure

Under the post-2020 Cap-and-Trade Offset Protocols, eligible offset credits would be generated through projects that are in conformance with all applicable environmental, health, and safety regulations. Implementation of the ODS Offset Protocol and the Urban Forest Offset Protocol projects would not include activities that would be located within agriculture or forest resources, and thus could not adversely affect farmland or forest lands. Implementation of the Livestock Offset Protocol would include the operation of digesters in agricultural settings. Digesters are consistent with agricultural uses and would not represent an adverse change to agriculture or forest resources. Implementation of the U.S. Forest Offset Protocol would not increase the amount of forest activities, but could shift activities to projects that increase carbon sequestration (i.e., reforestation, avoided deforestation).. The U.S. Forest Offset Protocol does not incentivize actions that would encourage the conversion of agricultural land or forest lands (CARB 2010).

Implementation of the Rice Protocol would not incentivize new rice fields on lands not currently in production, and would not adversely affect agricultural and forest resources (CARB 2014a). Implementation of landfill projects in Ontario would involve the operation of gas collection and control systems, which would not be located on agricultural or forest lands.

Generally, projects associated with the MMC Protocol would be in areas designated for mining; however, offset projects located at active or abandoned mines could be within or adjacent to forested areas. Compliance with permitting requirements pursuant to SMCRA would avoid conflicts with reforestation activities or restoration of agricultural activities under any approved mine reclamation plans (CARB 2013). Thus, there would not be substantial changes to agricultural or forest resources associated with operational activities related to the Cap-and-Trade Program under the ~~Proposed~~Scoping Plan.

The reasonably foreseeable compliance responses and impacts associated with implementation of offset protocols in Canada would be similar to those described above for mine methane capture, ODS, and landfill projects. As discussed, there would not be substantial impacts related to ODS, or landfill projects. However, because SMCRA is a federal regulation in the U.S., it cannot be implemented in Canada. As a result, projects located at active or abandoned mines associated with the MMC Protocol could adversely affect forest and agricultural lands within Canada.

ii. LCFS Measure

Implementation of the ~~Proposed~~Scoping Plan could result in more stringent requirements under LCFS that would decrease the overall average CI level of California's fuel. These actions could result in an increase in the cultivation of feedstock, such as soy, sugarcane, and oil seeds. In addition, ethanol supplies could shift away from corn-based ethanol toward other feedstocks, such as cane, sorghum, cellulosic, and molasses. This may increase agricultural production in some areas or result in changes to crop types. Fuels would be subject to carbon intensity (CI) evaluation. The LCFS regulation requires evaluation of a fuel's CI value. A fuel's CI is determined by evaluating the direct and indirect greenhouse gas (GHG) emissions over the fuel's life cycle. The direct emissions that are a result of fuel production, transportation, distribution, and consumption are calculated for each step in the fuel pathway. For example, these steps may involve the following activities needed to produce soy biodiesel:

- farming practices (e.g., frequency and type of fertilizer used);
- crop yields;
- carbon dioxide absorbed by the crop;
- collection and transportation of the crop;
- type of fuel production;
- fuel used in the production (e.g., coal, biomass);
- energy efficiency of the production;

- co-products generated that may be applied to other uses;
- transport and distribution of the fuel; and
- combustion of the fuel in vehicles.

Direct and indirect emissions that result from the change in land use or other market-mediated outcomes of fuel production or consumption are also evaluated and reflected in the fuel CI value. For some crop-based biofuels, land use changes may be a substantial source of additional GHG emissions. However, CI level standards limit the extent to which agricultural and forest resources could be affected by increased demand for low-emission diesel fuels and reduced CI of other fuels. Nonetheless, increased feedstock production could alter the location and extent of fuel-based agricultural feedstock cultivation and production. Demand for feedstock could displace food-based production on agricultural land currently used for row crops, orchards, and grazing. This increased demand could potentially result in indirect land use changes where food-based agriculture could shift to other areas; thereby, increasing pressure for conversion of rangeland, grassland, forests, and other uses to agriculture.

Because the LCFS program, which would regulate new fuel standards under the ~~Proposed~~Scoping Plan, is market-driven, it is not possible to determine the exact locations where feedstocks may be cultivated. The amount of land required to produce enough biofuel to meet projected demand depends entirely on the productivity of a given feedstock on a given parcel of land. Feedstocks may be sourced from forest or agricultural lands, and would be dependent on available quantities and location of processing facilities. The productivity is, in turn, governed by a wide variety of physiological factors, including genetic diversity, agronomic practice, and environmental factors, such as soil quality, water availability, and climate. Thus, predicting the amount of land required to produce enough low-carbon biofuel to impact existing agricultural practices could result in variable conclusions. In addition, the use of residual biomass from agricultural, forestry, and municipal activities decreases the amount of land needed for energy crops. Likewise, the development of energy crops adapted to be highly productive on lands marginal for other agricultural uses could reduce the potential impact of biofuel production on non-fuel crop production. Decisions regarding land use and feedstock choices would have an impact on how much biofuel could be produced in each area. However, because the recommended fuels regulations would provide market-based incentives that could lead to an increase in the production of certain agricultural feedstocks to produce low-carbon biofuels, such an increase could contribute to potential land use changes that could adversely affect agricultural and forest resources.

Impact Significance Determination

For the reasons discussed above, operational impacts on agriculture and forest resources could be potentially significant due to implementation of the reasonably foreseeable compliance responses associated with Cap-and-Trade offset protocols and changes in land uses associated with increased stringency of the LCFS regulation.

Mitigation Measures

Potential operational agricultural and forest resource impacts could be reduced to a less-than-significant level by mitigation measures prescribed by local, State, federal, or other land use or permitting agencies (either in the United States or abroad) with approval authority over the development projects. However, because CARB has no land use authority, mitigation is not within its purview to reduce potentially significant impacts to less-than-significant levels.

Mitigation Measure 2.b.i:

As described above, impacts related to mine methane offset protocol projects would be reduced to a less-than-significant level through implementation of existing regulations, including SMCRA, the Clean Water Act, and the Soil and Water Resources Conservation Act. The U.S. federal government and CARB lack the authority to propose or implement these, or similar laws within Canada. Thus, the authority to determine project-level impacts and applicable regulations lies with the permitting agency for individual projects in Canada. As a result, no mitigation is available to reduce potentially significant impacts related to mine methane offset projects in Canada.

Mitigation Measure 2.b.ii: Implement Mitigation Measure 2.a

Post-Mitigation Significance Determination

Because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this Final~~Draft~~ EA does not attempt to address project-specific details of mitigation, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts related to the conversion of agriculture and forest resources.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this Final~~Draft~~ EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes that, operational impacts to agriculture and forest resources associated with reasonably foreseeable compliance responses related to increased stringency of the LCFS regulation and offset protocols under the Cap-and-Trade Program under the ~~Proposed~~Scoping Plan would be **potentially significant and unavoidable**.

3. Air Quality

a) Impact 3.a: Construction-Related Impacts to Air Quality

As summarized in Chapter 2, section D.1, the reasonably foreseeable compliance responses associated with the ~~Proposed~~Scoping Plan would require construction activities. These impacts address the building phase of both reasonably foreseeable

construction of new facilities or modification of existing facilities that involve earth-moving activities.

Proposed development of new manufacturing facilities would be required to secure local or State land use approvals prior to their implementation. Part of the development review and approval process for projects located in California requires environmental review consistent with California environmental laws (e.g., CEQA) and other applicable local requirements (e.g., local air quality management district rules and regulations). The environmental review process would include an assessment of whether implementation of such projects could result in construction-related air quality impacts.

At this time, the specific location, type, and number of construction activities is not known and would be dependent upon a variety of factors that are not within the control or authority of CARB and not within its purview. Nonetheless, the analysis presented here provides a good-faith disclosure of the general types of construction emission impacts that could occur with implementation of these reasonably foreseeable compliance responses. Further, subsequent environmental review should be conducted at such time that an individual project is proposed and land use or construction approvals are sought.

It is generally expected that during the construction phase for any facilities, criteria air pollutants and toxic air contaminants (TACs) could be generated from a variety of activities and emission sources. These emissions would be temporary and occur intermittently depending on the intensity of construction on a given day. Site grading and excavation activities would generate fugitive particulate matter (PM) dust emissions, which is the primary pollutant of concern during construction. Fugitive PM dust emissions (i.e., respirable particulate matter [PM_{10} and $PM_{2.5}$]) vary as a function of several parameters, such as soil silt content and moisture, wind speed, acreage of disturbance area, and the intensity of activity performed with construction equipment. Exhaust emissions from off-road construction equipment, material delivery trips, and construction worker-commute trips could also contribute to short-term increases in PM emissions, but to a lesser extent. Exhaust emissions from construction-related mobile sources also include reactive organic gases (ROG) and oxides of nitrogen (NOx). These emission types and associated levels fluctuate greatly depending on the type, number, and duration of usage for the varying equipment.

The site preparation phase typically generates the most substantial emission levels because of the on-site equipment and ground-disturbing activities associated with grading, compacting, and excavation. Site preparation equipment and activities typically include backhoes, bulldozers, loaders, and excavation equipment (e.g., graders and scrapers). Although detailed construction information is not available at this time, based on the types of activities that could be conducted, it would be expected that the primary sources of construction-related emissions include soil disturbance- and equipment-related activities (e.g., use of backhoes, bulldozers, excavators, and other related equipment). Based on typical emission rates and other parameters for above- mentioned equipment and activities, construction activities could result in

hundreds of pounds of daily NOx and PM emissions (i.e., the amount generated from two to four pieces of heavy-duty equipment working eight hours per day), which may exceed general mass emissions limits of a local or regional air quality management district depending on the location of the emissions. Thus, implementation of new regulations and/or incentives could generate levels that conflict with applicable air quality plans, exceed or contribute substantially to an existing or projected exceedance of State or national ambient air quality standards, or expose sensitive receptors to substantial pollutant concentrations.

Impact Significance Determination

For the reasons described above, construction-related air quality impacts associated with implementation of the ~~Proposed~~Scoping Plan could be potentially significant.

Mitigation Measures

Potential construction-related air quality impacts could be reduced to a less-than-significant level by mitigation measures that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

Mitigation Measure 3.a:

The Regulatory Setting in Attachment A includes applicable laws and regulations that provide protection of air quality. CARB does not have the authority to require implementation of mitigation measures related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is within the purview of jurisdictions with local or State land use approval and/or permitting authority. New or modified facilities in California would likely qualify as a “project” under CEQA, because they would generally need a discretionary public agency approval and could affect the physical environment. The jurisdiction with primary approval authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA. Project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices routinely required to avoid and/or minimize impacts to air quality include the following:

- Proponents of new or modified facilities, or infrastructure constructed because of reasonably foreseeable compliance responses, would coordinate with State or local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local or State land use agency or governing body must follow all applicable environmental regulations as part of approval of a project for development.

- Based on the results of the environmental review, proponents would implement all feasible mitigation to reduce or substantially lessen the potentially significant air quality impacts of the project.

- Project proponents would apply for, secure, and comply with all appropriate air quality permits for project construction from the local agencies with air quality jurisdiction and from other applicable agencies, if appropriate, prior to construction mobilization.

- Project proponents would comply with the federal Clean Air Act and the California Clean Air Act (e.g., New Source Review and Best Available Control Technology criteria, if applicable).

- Project proponents would comply with local plans, policies, ordinances, rules, and regulations regarding air quality-related emissions and associated exposure (e.g., construction-related fugitive PM dust regulations, indirect source review, and payment into offsite mitigation funds).

- For projects located in PM nonattainment areas, prepare and comply with a dust abatement plan that addresses emissions of fugitive dust during construction and operation of the project.

Post-Mitigation Significance Determination

Because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this Final~~Draft~~ EA does not attempt to address project-specific details of mitigation, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant air quality impacts.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this Final~~Draft~~ EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that construction-related air quality impacts with the ~~Proposed~~Scoping Plan would be **potentially significant and unavoidable**.

b) Impact 3.b: Operational Impacts to Air Quality

As summarized in Chapter 2, section D.2, the reasonably foreseeable compliance responses associated with the ~~Proposed~~Scoping Plan could require long-term operational changes. These operational changes are related to implementation of Renewable Energy and Energy Efficiency Including SB 350 measures, SLCP Strategy, State SIP Strategy measures, SB 375, LCFS, and Cap-and-Trade Program measures~~, and 20 Percent Reduction in GHGs at Refineries measures~~.

In compliance with AB 197 and its requirements for scoping plan updates, estimated ranges for potential GHG, criteria, and toxics emissions were developed for specific measures evaluated in the development of the ~~Proposed~~Scoping Plan. These ranges by measure for the single year 2030 allow for the comparison of air quality benefits across potential measures as the ~~Proposed~~Scoping Plan is being developed and to determine

if any measure could potentially increase criteria or toxics emissions. For the measures included in the proposed scenario to achieve the 2030 target (in Chapter II of the ~~Proposed~~Scoping Plan), the modeling estimates show that the ~~Proposed~~Scoping Plan measures reduce GHG, NOx, VOC, and $PM_{2.5}$ emissions as part of long-term operations in 2030. Below is a summary analysis of the air quality benefits associated with the compliance responses for each of the proposed measures.

i. Renewable Energy and Energy Efficiency, Including SB 350 Measures

Electricity Supply

In order for the State to achieve the proposed 50 percent increase of electricity procurement from renewable sources by 2030, deployment of renewable energy projects and transmission facilities would be necessary.

The most prevalent renewable resources used in California are solar and wind. Both solar and wind power produce no direct air emissions from operations. Emissions are possible during routine maintenance activities, such as from use of greases and solvents, but these activities would not be unique to these operations and considered minor (e.g., less than local air district thresholds). However, because grid operators must constantly match electricity supply and demand, variable renewable resources are more challenging to incorporate into the electricity grid than conventional generation technologies. As a result, conventional generation such as fast-ramping and load-following combined-cycle or simple-cycle gas turbines often provide the ancillary services necessary to maintain reliable grid operations. Demand response or energy storage technologies (e.g., large battery technology) can provide additional means to optimize use of variable and off-peak renewable generation and provide for the ancillary services currently supplied by gas-fired generation. Absent additional energy storage and demand-side reductions, this could mean increased reliance on gas-fired generation, which could result in an increase in criteria air pollutants.

Other RPS-eligible resources include biogas-fueled generation (anaerobic digestion), solid fuel biomass plants, and geothermal plants. These resources are discussed further below.

Anaerobic digestion is a biological process that produces biogas from organic wastes such as landfills, livestock manure, wastewater treatment plants, and food processing waste. The captured biogas could help offset other emission sources by generating electricity. The quantity and type of emissions depends on the type of digester technology and may include NOx, carbon monoxide (CO), VOC, PM_{10}, $PM_{2.5}$, and SOx.

Biomass is waste and by-products that can be used as fuel for producing energy. Examples of some of the biomass residues used in direct combustion solid fuel biomass power plants include forest slash, urban wood waste, lumber waste, and agricultural waste. Biomass boilers emit criteria air pollutants and TACs. Emissions may also

include ammonia slip for units equipped with control technologies that use ammonia for NOx reduction (e.g., selective non-catalytic reduction). Particulate emission controls may include cyclones, baghouses, or electrostatic precipitators. Additional non-combustion particulate emissions may be emitted from on-site fuel receiving, handling, storage, and processing operations.

Geothermal energy is produced by the heat of the earth and is often associated with seismically active regions. Wells can be drilled into underground reservoirs for the generation of electricity. The steam from the reservoir can be used to power a turbine/generator or the hot water can be used to boil a working fluid that vaporizes and then turns a turbine. Most geothermal plants have a closed-loop water system where extracted water is pumped back into the reservoir after it has been used for electricity generation. The pumped hot water may contain sulfur and other minerals. Water is also used for cooling. In closed-loop systems, gases from the well are not exposed to the air and are injected back into the ground to minimize emissions. However, open-loop systems can emit hydrogen sulfide (H_2S), methane, CO_2, and other pollutants. In the atmosphere, H_2S is oxidized into SO_2. Small amounts of particulate may also be emitted from cooling towers.

Stationary sources of renewable energy that generate criteria air pollutants and/or TACs would be required to obtain authorities to construct and permits to operate from the applicable local air district. In addition, stationary sources would be required by law to comply with all applicable air district rules and regulations for criteria pollutants and TACs (e.g., new source review [best available control technologies and offsets for emission increases], toxic best available control technology, health risk evaluation, prohibitory rules, and airborne toxic control measures). The permit process along with adherence to all applicable rules and regulations require that these sources be equipped with required emission controls and that, individually, these sources would not result in emissions that exceed applicable thresholds. In addition, non-permitted sources of emissions (e.g., employee commute trips and deliveries) would be anticipated to be minor.

Overall, deploying more renewable energy would reduce fossil-fuel power plant electricity generation; thus, decreasing their associated air emissions.

Energy Efficiency

The SB 350 goal of doubling energy efficiency savings by 2030 could be met through energy efficiency measures in residential and commercial buildings, industry, agriculture, and street lighting. Generally, these could include new HVAC, building shell or end use technology used in the residential and commercial sectors (e.g., a greater share of high efficiency appliances); a reduction in energy services demand, due to conservation or behavior change; and a reduction in total energy demand.

Specifically, these measures include:

- Increase in high efficiency residential electric water heaters, central air conditioners, gas clothes driers, residential refrigerators, and light-emitting diode lightbulbs.
- Improvement in the electric efficiency of other equipment, such as televisions and cable set top boxes.
- Increase in high efficiency commercial natural gas water heaters, heat pump water heaters, electric space heating, electric cooking ranges, light-emitting diode lightbulbs, refrigerators, and ventilation.
- Improvements in the efficiency of other end-uses, such as computers and other electronics.
- Improved efficiency of industrial cooling and refrigeration processes, lighting, machine drive efficiency,
- Improved efficiency in street lighting and agricultural lighting.
- Reduction residential and commercial water heating demand due to urban water efficiency measures.
- Reduction in residential heating and cooling loads due to improved windows and behavioral change (i.e., change in thermostat set point).
- Reduction in residential lighting service demand due to behavioral change (i.e., turning off lights when not in use).

At this time, the specific types of energy efficiency measures may not reflect the specific future energy efficiency programs or activities, and would be identified by implementing agencies in their rulemaking. Nonetheless, the analysis presented herein provides a good-faith disclosure of the general types of energy efficiency emission impacts that could occur with implementation of these reasonably foreseeable compliance responses.

It is generally expected that these energy efficiency measures would reduce the combustion of fossil fuel at the power generating facility or at end-use (i.e., high efficiency natural gas water heater), thus decreasing their associated air emissions.

ii. SLCP Measures

Methane Reduction Measures

Reasonably foreseeable compliance responses that could result from implementation of the methane reduction measures under the SLCP Strategy could include: operation of new modified digesters, either on-site or centralized, for dairies, landfills and wastewater treatments plants to convert manure, organic wastes, and solid wastes to biogas (which may include electricity generator sets, biogas storage tanks and compression and cleaning equipment, above ground pipeline systems, transmission poles and wires, and vehicle fueling stations); changes to manure management systems and practices at dairies (e.g., scrape manure systems or equipment such as manure vacuums, storage silos and tanks, and pasturing of cattle or a hybrid of both pasture and conventional systems); the operation of organic material composting facilities that would convert organic materials diverted from landfills into compostable materials; and, the collection

and reduction of methane emissions from oil and gas facilities (which may include inspection and monitoring of infrastructure and disposal of methane vapors). The quantity and type of potential emission increases would depend of the type of technologies used, and may include CO, PM, SOx, VOCs, NOx, ammonia, and H_2S emissions.

Many California dairies use flush manure management systems with liquid waste discharged to lagoons. These lagoons typically produce ammonia, H2S, and VOCs. Reduction strategies for agricultural methane from dairies could involve implementation of solid manure management practices or installation of digesters. Solid manure management practices could increase emissions associated with use of on-farm equipment and trucking to handle manure, as well as PM10, ammonia, nitrous oxide, and VOCs. However, use of solid manure management practices in conjunction with digester systems could potentially reduce odors and emissions of VOCs, ammonia, and H2S associated with flush systems. Biogas produced in the digester can be conditioned to produce RNG for pipeline injection or vehicle fuel. Combustion of RNG in a vehicle may generate NOx emissions but would be expected to reduce mobile source NOx by replacing petroleum-based fuels. Natural gas vehicles may produce less NOx emissions than petroleum-fueled vehicles and could also reduce diesel PM (a TAC and SLCP) if replacing diesel fuels.

Equipment associated with digesters could potentially increase regional NOx emissions in the absence of continued permitting and regulatory work by CARB and Air Districts to ensure that digester operation is consistent with air quality requirements. Flares used with biogas cleaning and compressing facilities could increase NOx emissions, but they are typically only used for emergency purposes and are subject to local air district permit requirements. If producing vehicle fuel is not an option, digester biogas could be used to generate electricity onsite. Certified distributed generation technologies are intended to have comparable emissions to large gas turbine grid power but are still a source of NOx emissions. CARB anticipates that the legal mandates applicable to permitting these facilities, as well as to its regulatory process, will ultimately address these issues, but notes them here to be conservative.

Operation of new green waste composting facilities could potentially increase VOC and PM emissions depending on the type of composting employed. These facilities could also cause other criteria pollutant emissions associated with the use of heavy equipment on-site (e.g., tractors, compost turners, and grinders) and from waste-haul truck traffic to and from the sites. Air quality impacts from the operation of digesters and associated equipment at composting facilities could potentially increase emissions. The quantity and type of emission increases would depend on the type of digester technology and the end use of the captured biogas and may include CO, PM, SOx, VOC, and NOx. Although there would be emissions associated with these sources at anaerobic digestion and composting facilities, the operation would divert organics out of landfills. As a result, there would be less mobile source at activity at landfills. Operation

of digestion facilities could also help offset other emission sources by generating electricity or producing biogas as a substitute for fossil vehicle fuels.

Operation of digesters and associated equipment at existing or new wastewater treatment plants could also potentially increase emissions. The quantity and type of increases would be dependent on the type of digester technology and the end use of the captured biogas and may include CO, PM, SOx, VOC, and NOx.

For oil and gas facilities, reasonably foreseeable compliance responses include emission control additions to storage tanks, pipelines, and compressors within existing processing and storage facilities. Some controls are already required by local air districts to reduce VOCs and NOx. This measure would uniformly expand control of such sources and regulate additional infrastructure (e.g., valves, flanges, and seals). There are potential VOC and TAC emission benefits from this measure. It is anticipated that the measure, including potential requirements to upgrade existing combustion equipment to low-NOx devices, would likely result in net beneficial impacts to air quality.

Because the implementation details of many of the methane measures identified in the SLCP Strategy depend substantially on the design of future incentive and regulatory programs, and upon local permitting decisions, long-term air quality impacts at this point are difficult to categorize with certainty. As described above, there are methods available to implement the identified measures that may have beneficial impacts on long-term air quality through the replacement of more-polluting emissions sources and fuels. Indeed, as a statutory matter, per SB 605, SB 1383, and AB 32, along with existing Health and Safety Code mandates for criteria pollutant planning, CARB will ultimately need to develop approaches to addressing these issues that ensure that air quality goals are achieved. However, for the conservative purposes of this programmatic analysis, CARB has also disclosed implementation choices that could substantially affect air quality.

HFC Measures

The HFC reduction measures under the SLCP Strategy contain actions to reduce HFC emissions within the State through replacing high-GWP HFCs, used as refrigerants, foam expansion agents, aerosol propellants, and to a lesser extent, as solvents and fire suppressants, with low-GWP compounds such as ammonia, CO2, hydrocarbons, lower-GWP HFCs, and HFOs. This may require modifications to existing facilities.

It is reasonably foreseeable that increased operational use of hydrocarbons, ammonia, and HFOs could result in additional emissions of VOCs from hydrocarbons, and particulate matter from ammonia from these modified facilities. These potential increases would be considered minimal in relation to current baseline levels. The Final~~Revised Draft~~ EA for the Proposed SLCP Strategy, which is incorporated by reference, provides further details of this analysis.

iii. State SIP Strategy Measures

These measures include numerous programs that could improve vehicle efficiency, replace internal combustion vehicles with near-zero and zero-emission technologies, and decrease fossil fuel use in the transportation sector originally outlined in the Mobile Sources Strategy and included in the Proposed 2016 State Strategy for the State Implementation Plan (State SIP Strategy). In addition, there are emission reductions from off-road subsectors such as aviation, and rail and ocean-going vessels, which reflect the guidance in the California Sustainable Freight Action Plan. While the specific compliance measures would require evaluation to determine the anticipated results of these program impacts, improved reductions in criteria air pollutants and TACs are expected as a result of increased vehicle efficiency, increased near-zero and zero-emission vehicles, a decrease in diesel- and gasoline-fueled vehicles as a percentage of all vehicles, and decreased fossil fuel consumption.

Reasonably foreseeable compliance responses associated with the measures associated with the State SIP Strategy and the California Sustainable Freight Action Plan include operation of new manufacturing facilities to support increased market penetration of PHEV, non-combustion ZEV including BEVs and hydrogen FCEV zero-emission technologies, and electric-powered equipment (e.g., forklifts). Increased use of near-zero and zero-emission technologies may result in increased infrastructure for natural gas and hydrogen refueling and charging stations, and increased demand for lithium battery manufacturing and associated increases in lithium mining and exports. New testing centers to monitor vehicle emissions may be operated throughout the State.

In addition, battery-powered electric vehicles require electricity, which could be generated from fossil fuels (albeit in declining amounts as renewable energy mandates, including those under SB 350, continue to lower the overall carbon intensity of the grid). Generation of electricity from fossil fuels results in emissions, including SO_2, NO_X, PM, and CO_2 depending on the source (e.g., coal, natural gas, solar). These would constitute stationary source emissions. Stationary sources that generate criteria air pollutants and/or TACs would be required to obtain authorities to construct and permits to operate from the applicable local air district. In addition, stationary sources would be required by law to comply with all applicable air district rules and regulations for criteria air pollutants and TACs (e.g., new source review [best available control technology and offsets for emission increases], toxic best available control technology, health risk evaluation, prohibitory rules and airborne toxic control measures). The permit process along with adherence to all applicable rules and regulations would require these sources be equipped with required emission controls and that, individually, these sources would not result in emissions that exceed applicable thresholds. In addition, non-permitted sources of emissions (e.g., employee commute trips and deliveries) would be anticipated to be minor.

As discussed in more detail in the State SIP Strategy, developed from the Mobile Source Strategy, the proposed measures would result in substantial long-term

reductions in criteria air pollutants. These transportation sector measures are anticipated to result in emission reductions of NOx, ROG, and PM2.5. The proposed measures within the State SIP Strategy are designed to result in substantial long-term reductions in criteria air pollutants, although it is possible that certain aspects of the State SIP Strategy may cause comparatively small emission increases when viewed in isolation. These potential incremental increases would be offset by the overall substantial long-term reductions in criteria and toxic air pollutants

iv. SB 375 Measure

This measure promotes integration of land use development patterns with transportation networks and other transportation policies in a way that achieves passenger vehicle-related GHG emission reductions. Under SB 375, California's 18 regional metropolitan planning organizations (MPOs) are responsible for developing Sustainable Communities Strategies (SCSs) toward meeting regional GHG reduction targets set by the State. Reasonably foreseeable operational impacts of this measure include adoption of additional and/or more aggressive regional and local actions to change land use patterns, transportation infrastructure investments, and enhance travel management programs, including:

- Increasing infill development, brownfield development, transit-oriented development, and compact building design.
- Improving transportation options by expanding transit networks, pedestrian and bicycle facility connectivity and infrastructure, as well as linkages between the different modes of travel.
- Implementation of congestion management systems, parking management systems, pricing, and employer-based commute trip reduction programs.

These strategies in MPO SCSs could lead to changes to the land use patterns and the transportation network in ways that may impact the air quality environment. Generally, SCS strategies result in less total regional on-road vehicle-related criteria pollutant emissions and facilitate local air quality planning efforts as part of the implementation of the applicable air quality plans. However, although mobile source emissions will decrease over the planning period, there may be some increases in localized exposure to TACs. For example, improvements to existing facilities identified in an RTP/SCS (e.g., road widenings, intersection or interchange improvements, intelligent transportation system upgrades, turn pockets, high-occupancy vehicle (HOV) lanes, and auxiliary and transition lanes) all have the potential to increase the amount of locally-generated TAC emissions in an area where the transportation infrastructure capacity is increased. Some roadway improvements would be intended to ease congestion and reduce idling, while others would be intended to improve physical roadway conditions. Overall, MPOs are expected to meet new targets through actions that would reduce VMT, encourage the use of ZEVs, and decrease reliance on personal vehicles. Thus, in the long-term, more stringent SB 375 targets would reduce criteria air emissions overall.

v. LCFS Measure

The increased proposed LCFS measure, along with other local, State, and federal policies to support alternative fuel adoption, would be anticipated to result in reductions for several criteria air pollutants and TACs. Alternative transportation fuels are produced from a variety of feedstocks. These feedstocks include natural gas, biomass material, biowaste material, waste grease, animal tallow, and municipal solid waste. Relative to petroleum diesel emissions from engine combustion, exhaust emissions from the most common substitutes (e.g., biodiesel and renewable diesel) have been shown to contain less PM, hydrocarbons, CO, and polycyclic aromatic hydrocarbons.

The combustion of higher biodiesel blends in older diesel engines that lack appropriate on-vehicle emission control technology can increase the release of NO_X. ~~However, i~~In 2015 the Board adopted the Alternative Diesel Fuel regulation that requires NOx mitigation for biodiesel blends until diesel engines with appropriate control technology are fully deployed. Pursuant to the writ of mandate issued by the Fresno Superior Court (Superior Court) in *POET, LLC v. California Air Resources Board* on October 18, 2017, CARB is currently addressing whether the LCFS regulation is likely to have caused an increase in NOx emissions related to the use of alternative diesel fuels in the past, and whether the LCFS is likely to cause an increase in NOx emissions in the future. CARB staff believes that in conjunction with anticipated regulatory amendments to the LCFS program and other remedial measures, any potential NOx impacts from the LCFS measure will be successfully mitigated in accordance with CEQA. Additionally, ~~R~~renewable diesel has been found to decrease NO_X relative to conventional diesel.

Emission reductions from the reduced tailpipe emissions associated with the replacement of conventional diesel with substitute fuels are expected to eclipse any increased emissions associated with feedstock and fuel truck trips from additional California biofuel production facilities and transport from out-of-state biofuel production facilities. In addition, stationary source emissions associated with transportation fuel production would be subject to local rules and regulations (e.g., authority to construct and permit to operate requirements) and, consequently, would not be approved by local air districts if emissions were to exceed designated levels for attaining and maintaining ambient air quality standards, and/or exceed acceptable risk levels for toxic exposure.

Thus, any proposed increase in stringency for the LCFS program, in the context of existing support and limits on the use of alternative fuels, would provide a pathway to the commercialization of innovative, lower-carbon substitutes that would result in decreased emissions of PM, CO, TAC, NOx, and other air pollutants.

vi. Cap-and-Trade Program Measure

The covered entity compliance responses consist of upgrading equipment, switching to lower intensity carbon fuels, and implementing maintenance and process changes at existing facilities. The 2010 FED considered the possibility that some covered entities might increase operation of specific equipment, which could increase local emissions.

Compliance obligations under the Cap-and-Trade program have only been effective since January 1, 2013. ~~Because~~ As discussed further in the July 17, 2017 Final Environmental Analysis Prepared For The Proposed Amendments to the California Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms Regulation (2017 Cap-and-Trade Amendments Final EA)[7], because CARB has received so few years of reported data to date, CARB lacks sufficient information to conclude with certainty that localized emissions increases have not occurred. While CARB continues to believe, in part based on its analysis detailed below, that resulting localized air impacts are extremely unlikely, the potential for localized increases cannot be entirely dismissed.

However, per the analysis required by AB 197 that is provided in the Scoping Plan~~main~~ document, CARB staff have analyzed the directional air pollution impacts of the Cap-and-Trade Measure, and concluded ~~the~~ that decreases in air pollution are likely. This analysis has limits, due to the inherent flexibility of the cap-and-trade regulation, as well as the overlay of other complementary GHG reduction measures, the mix of compliance strategies that individual facilities may use is not known. However, based on current law and policies that control industrial and electricity generating sources of air pollution, and expected compliance responses, CARB believes that emissions increases at the statewide, regional, or local level due to the program are not likely.

Furthermore, recently enacted AB 617 includes several aspects to further California's climate programs while protecting the state's disadvantaged communities. For example, AB 617 authorizes and directs CARB to take several actions to improve data reporting from facilities, air quality monitoring, and pollution reduction planning for communities affected by a high cumulative exposure burden. These efforts will yield criteria pollutant emissions reductions from sources regulated by the Cap-and-Trade Program. For more information, see Master Response 1 in the Response to Comments.

A more stringent post-2020 cap-and-trade program will provide an incentive for covered facilities to decrease GHG emissions and any related emissions of criteria and toxic pollutants. Please see CARB's Co-Pollutant Emissions Assessment (Appendix P of the Staff Report: Initial Statement of Reasons Proposed Regulation to Implement the California Cap-And-Trade Program[8]), as well as the 2017 Cap-and-Trade Amendments Final EA, and the Response to Comments on the Draft Environmental Analysis for the Proposed Amendments to the California Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms Regulation[9] for a more detailed evaluation of a cap-and-trade program and associated air emissions.

Implementation of the ODS Offset Protocol and the Livestock Offset Protocol would produce incidental emissions from transportation. Operational activities associated with

[7] Available at https://www.arb.ca.gov/regact/2016/capandtrade16/finalea.pdf.
[8] Cap-and-Trade 2010 documents available at https://www.arb.ca.gov/regact/2010/capandtrade10/capandtrade10.htm.
[9] Available at https://www.arb.ca.gov/regact/2016/capandtrade16/finalrtc.pdf.

MMC offset projects could cause an increase in criteria air pollutants or TACs. Changes in cultivation practices under the Rice Protocol would not result in changes to equipment that could substantially affect air pollutant emissions. Projects implemented under the Urban Forest Offset Protocol would produce minimal emissions from landscaping and maintenance activities. The U.S. Forest Offset Protocol would not alter the level of forest. Projects associated with offset protocols would need to be implemented in accordance with all applicable federal, state, and local regulation and regulatory oversight requirements (see Attachment A) in order to be issued credits for emission reductions; therefore, there would not be substantial air emissions associated with operations of the Cap-and-Trade Program. Recently enacted AB 398 requires CARB to develop regulations reducing the quantitative usage limit for offsets, and requires one half of offsets within that limit to confer direct environmental benefits to the state, from the period of January 1, 2021 to December 31, 2030. AB 398 also establishes a Compliance Offsets Protocol Task Force to provide guidance to CARB in approving new offset protocols for the purpose of increasing offset projects with direct benefits within the state while prioritizing disadvantaged communities, Native American or tribal lands, and rural and agricultural regions.

~~vii. 20 Percent Reduction in GHGs at Refineries Measure~~

~~Both a direct CARB regulation and BARCT/All Feasible Measures approaches would drive refinery emission reductions. Petroleum refineries use a wide variety of processes, which are largely determined by the composition of the crude oil feedstock and the type of product needed. Criteria air pollutants (or their precursors) include non-condensable VOCs and SOx from process equipment and particulate from coking operations. Process VOC emissions may be controlled using a flare, thermal incinerator, or other air pollution control technique. SOx emissions are often controlled by passing process gases through a scrubber. Refineries also include many stationary combustion sources such as process heaters, boilers, internal combustion engines, and gas turbines. The fuel burned in these sources may include refinery gas, natural gas, residual fuel oil, or a combination. Criteria air pollutants emitted from fuel combustion include NOx, CO, VOC, PM10, PM2.5, SOx, as well as TACs. Their quantities depend on the type of fuel, constituents in the fuel, and the burner efficiency/heat rate of the combustion device, in addition to other emission control devices incorporated within the equipment design or employed via post-combustion controls.~~

~~Fugitive emission sources include VOCs from vapor leaks from process equipment such as valves, flanges, pump and compressor seals, process drains, cooling towers, and oil/water separators. Control of fugitive emissions usually involves minimizing leaks and spills through equipment changes, procedural changes, and improved monitoring and maintenance practices. Fugitive emissions may also occur from venting and flaring events.~~

~~Water effluent from various refinery processes is collected and conveyed to an onsite wastewater treatment plant. The primary emissions are fugitive VOCs and dissolved~~

~~gases that evaporate from the waste water surfaces in open process drains, separators, and ponds. Controls include covering systems and removing dissolved gases with water strippers before their contact with the air.~~

~~Cooling towers are used at refineries to transfer waste heat from the cooling water to the atmosphere. Organic TACs and VOCs are picked up by cooling water from leaks in heat exchangers and condensers and emitted from the water as it comes into contact with the air.~~

~~Finished product loading emissions occur when vapor is displaced by the product when it is loaded into tanker trucks, rail cars, and marine vessels. The vapor may contain constituents from the product such as TACs and VOCs. Control devices may include thermal or catalytic incinerators, adsorption systems, scrubbers, vapor balance system, and flares.~~

~~Under this measure, facilities would become more efficient on a barrel basis reflected as a GHG emissions per unit of product benchmark. This can be accomplished through a number of avenues that include fuel switching, boiler electrification, onsite investments in more energy efficient technology, and processing of lighter crudes. Onsite fuel use reductions through efficiency measures, can lead to a decrease in criteria air pollutants and TACs. Crude oil types are typically differentiated by their density and sulfur content (high sulfur content is called a sour crude). Heavier, more sour crude oil generally entails more processing to produce a refined product, including removal of sulfur. Therefore, the corresponding reduced energy requirements to process lighter crude oil is expected to reduce corresponding criteria air pollutants and TACs from process equipment and fuel combustion. If fossil natural gas is replaced with RNG in a combustion device, you may get GHG benefits, but concurrent reductions in criteria air pollutants or TACs are not guaranteed. RNG (or biomethane) is biogas that has gone through a pretreatment and upgrading process to have properties similar to fossil natural gas; therefore, both gases are expected to have similar combustion and emission qualities. Both fossil natural gas and RNG are primarily methane, but also contain other constituents. Like fossil natural gas combustion, emissions from RNG combustion may include NOx, CO, VOC, PM_{10}, $PM_{2.5}$, and SOx, as well as TACs. RNG would be expected to be delivered via gas pipeline. There are emissions associated with production of biogas and subsequent clean-up and upgrading to biomethane. Digester technology would be a likely source of biogas for RNG production. The equipment associated with digesters could potentially increase local air pollutant emissions in the absence of continued permitting and regulatory work by CARB and air districts to ensure that digester operation is consistent with air quality requirements. Flares used with biogas cleaning and compressing facilities could increase NOx emissions, but they are typically only used for emergency purposes and are subject to air district permit requirements. CARB anticipates that the emissions associated with these digester facilities will be addressed during the permitting and regulatory process, but notes them here to be conservative.~~

~~New or modified stationary sources that generate criteria air pollutants and/or TACs, such as refineries, are required to obtain authorities to construct and permits to operate from the applicable local air district. In addition, stationary sources are required by law to comply with all applicable air district rules and regulations for criteria air pollutants and TACs (e.g., new source review [best available control technology and offsets for emission increases], toxic best available control technology, health risk evaluation, prohibitory rules and airborne toxic control measures). The permit process along with adherence to all applicable rules and regulations require that these sources be equipped with the required emission controls and that, individually, these sources would not result in emissions that exceed applicable thresholds. In addition, non-permitted sources of emissions (e.g., employee commute trips and deliveries) would be anticipated to be minor.~~

Impact Significance Determination

For the reasons described above, the ~~Proposed~~Scoping Plan measures would result in an overall beneficial impact to air quality through overall reductions in emissions of criteria air pollutants and TACs from the measures. The potential for adverse air quality impacts associated with some specific individual measures in isolation are discussed above to conservatively disclose that potential at this programmatic level, pending further design which would and should reduce these potential impacts to a less-than-significant level in later implementation phases. This overall ~~Proposed~~Scoping Plan conclusion, looking at the measures as a whole, is substantially driven by the fact that reducing GHGs from across the economy also results in significant co-pollutant reductions. The AB 197 estimates for the specific measures, included in the ~~Proposed~~Scoping Plan, all show that directionally there will be decreases in criteria air pollutants and TACs in the year 2030. Since each measure is expected to result in GHG reductions each year between 2021 and 2030, each year should also see a reduction in criteria air pollutants and TACs even though not explicitly estimated in the plan.

Further, though the programmatic level of this analysis necessarily limits source-specific or fine-grained regional analyses, it is important to note that the measures identified here would be implemented, as appropriate, only after further regulatory, permitting, and or other evaluation processes. Future measure specific CEQA analyses and mitigation requirements, along with the substantive requirements of state and federal air pollution law will require these measures to be implemented in ways consistent with the local, state, and federal mandates that ensure compliance with ambient air quality and TAC programs statewide, and in each region of the state.

Therefore, operational air quality impacts would be **beneficial**.

Mitigation Measures

No mitigation is necessary.

c) Impact 3.c: Construction-Related and Operational Odor Impacts

As summarized in Chapter 2, section D.2, the reasonably foreseeable compliance responses associated with the ~~Proposed~~Scoping Plan would require long-term operational changes. Operational changes that could result in odor impacts are related to implementation of methane reduction measures under the SLCP Strategy and the Livestock Offset Protocol under the Cap-and-Trade Program.

i. SLCP Measures

Implementation of the SLCP Strategy methane reduction measures could provide incentives for various construction projects, including: processing plants for agriculture-based ethanol, cellulosic ethanol, and biomethane. Proposed regulations could also incent minor expansions to existing operations, such as digester facilities at dairies, modifications to crude production facilities, and installation of energy management systems at refineries.

Although it is reasonably foreseeable that construction activities could occur, the exact location of any new facilities or modification of existing facilities is uncertain. Typically, such facilities would be in industrial or rural areas with appropriate zoning to accommodate these specific activities. Construction activities could generate odors associated with the operation of diesel equipment; however, such activities would be short-term in nature and would not be expected to adversely affect long-term air quality.

Implementation of the SLCP Strategy measures under the ~~Proposed~~Scoping Plan would encourage the collection of renewable gas from dairies, landfills, and wastewater treatment plants. Odors associated with these facilities is associated with gases released during the breakdown of organic materials, such as hydrogen sulfide (i.e., rotten egg smell). Generally, odor is considered a perceived nuisance and an environmental impact. Factors that would affect odor impacts include the design of collection facilities and exposure duration. Natural gas collection systems at landfills would involve wells for extraction of landfill methane produced from decomposing waste, and wastewater treatment plants would modify existing digesters in enclosed operations. Wastewater treatment plants also typically maintain odor control systems to address fugitive emissions at existing facilities. However, manure management at dairies typically involves flushing and/or scraping manure into on-site storage ponds or stockpiles. Manure in these storage ponds and stockpiles naturally undergo decomposition and release odorous compounds (e.g., ammonia and hydrogen sulfide). However, the implementation of new digester facilities at existing livestock operations would result in the manure being placed into the digester rather than into on-site storage ponds or stockpiles. This would limit open air degradation (resulting in the breakdown of volatile organic compounds through anaerobic processes that would occur in the closed system) and would result in more control over the exhaust emissions.

The construction of digesters associated with dairies could result in the manure being placed into the digester rather than into on-site storage ponds or stockpiles. This could limit open air degradation (resulting in the breakdown of volatile organic compounds

through anaerobic process that would occur in a closed system) and could result in more control over emissions than current conditions found at dairies that employ flush-water and scrape manure management systems (Regional Water Quality Control Board [RWQCB] 2010). Implementation of the methane reduction measures could result in increased construction and operation of anaerobic digesters. These may be small, and associated with individual businesses, or larger to accommodate regional needs. Wastewater treatment facilities and digesters constructed for manure and diverted organic waste would perform anaerobic digestions in a closed system; however, fugitive emissions of odorous compounds, such as ammonia and hydrogen sulfide, could be released into the environment (RWQCB 2010). These fugitive emissions of odorous compounds could be offensive to sensitive receptors, depending on their proximity, the design of anaerobic digesters, and exposure duration.

Further, the collection, transport, storage, and pre-processing activities of potentially odiferous organic substrates for digestion (e.g., manure, compost), in addition to the resulting digestate, could produce nuisance odors at or near anaerobic digesters. The development of new green waste composting facilities, which may include the operation of anaerobic digesters, could also result in the creation of new regional or localized sources of odors such as from the processing, storage, and aeration of compost materials.

ii. Cap-and-Trade Measure

Eligible offset credits must be generated through projects that are in conformance with all applicable environmental, health, and safety regulations. Implementation of the ODS, Urban Forest, U.S. Forest, Rice, and mine methane, and landfill projects would not include activities that would result in substantial odor emissions. Implementation of Livestock protocol project could result in operation of digesters (CARB 2010). These digesters would perform anaerobic digestions in a closed system, however fugitive emissions of odorous compounds, such as ammonia and hydrogen sulfide, could be released into the environment (RWQCB 2010). These fugitive emissions of odorous compounds could be offensive to sensitive receptors, depending on their proximity, the design of anaerobic digesters, and exposure duration.

Impact Significance Determination

Thus, odor impacts associated with the SLCP Strategy and the ~~Proposed~~Scoping Plan would be potentially significant.

Mitigation Measures

Potential odor impacts could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

Mitigation Measure 3.c.i

The Regulatory Setting in Attachment A includes applicable laws and regulations that provide protection of air quality. CARB does not have the authority to require implementation of mitigation related to projects that would be approved by local jurisdictions. The ability to require such measures is within the purview of jurisdictions with local or State land use approval and/or permitting authority. New or modified facilities in California would likely qualify as a "project" under CEQA, because they would generally need a discretionary public agency approval and could affect the physical environment. The jurisdiction with primary approval authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA. Project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices routinely required to avoid and/or minimize impacts to air quality include the following:

- Proponents shall implement an Odor Management Plan (OMP) as part of each application submitted to establish digester facilities. The OMP shall specifically address odor control associated with digester operations and include:
    - A list of potential odor sources.
    - Identification and description of the most likely sources of odor.
    - Identification of potential, intensity, and frequency of odor from likely sources.
    - A list of odor control technologies and management practices that could be implemented to minimize odor releases, which shall include the establishment of criteria for time limits related to on-site retention of undigested co-substrates (e.g., organic co-substrates must be put into the digester within 48 hours of receipt), provide negative pressure buildings for indoor unloading, treat collected foul air in a biofilter or air scrubbing system, establish contingency plans for operating downtime (e.g., equipment malfunction, power outage), manage delivery schedule to facilitate prompt handling of odorous co-substrates, protocol for monitoring and recording odor events, and protocol for reporting and responding to odor events.

Mitigation Measure 3.c.ii: Implement Mitigation Measure 3.c.i

Post-Mitigation Significance Determination

Because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this Final~~Draft~~ EA does not attempt to

address project-specific details of mitigation, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant air quality impacts.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this Final~~Draft~~ EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that odor impacts with the ~~Proposed~~Scoping Plan would be **potentially significant and unavoidable**.

4. Biological Resources

a) Impact 4.a: Construction-Related Impacts to Biological Resources

As summarized in Chapter 2, section D.1, the reasonably foreseeable compliance responses associated with the ~~Proposed~~Scoping Plan would require construction activities. These impacts address the building phase of both reasonably foreseeable construction of new facilities or modification of existing facilities that involve earth-moving activities.

The biological resources that could be affected by the construction of new manufacturing plants, biofuel facilities, or zero and near-zero-related infrastructure, would depend on the specific location of any necessary construction and its environmental setting, which is anticipated to mostly occur within existing disturbed commercial and industrial areas. Additionally, increased demand for biofuel feedstock production could result in expansion of agricultural lands into undeveloped areas, or areas that otherwise support biological resources. Adverse impacts could include modifications to existing habitat; including removal, degradation, and fragmentation of riparian systems, wetlands, or other sensitive natural wildlife habitat and plant communities; interference with wildlife movement or wildlife nursery sites; loss of special-status species; and/or conflicts with the provisions of adopted habitat conservation plans, natural community conservation plans, or other conservation plans or policies to protect natural resources.

Under the Cap-and-Trade Program, the covered entity compliance responses consist of upgrading equipment, switching to lower intensity carbon fuels, and implementing maintenance and process changes at existing facilities. Construction, grading and trenching have the potential to adversely impact any protected biological resources that might exist at those locations. Construction-related impacts would be like those discussed above.

Impact Significance Determination

For the reasons described above, construction-related impacts on biological resources associated with implementation of the ~~Proposed~~Scoping Plan could be potentially significant.

Mitigation Measures

Potential construction-related biological resources impacts could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

Mitigation Measure 4.a

The Regulatory Setting in Attachment A includes applicable laws and regulations that provide protection of biological resources. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local or State land use approval and/or permitting authority. New or modified facilities in California would qualify as a "project" under CEQA. The jurisdiction with primary approval authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices that are routinely required to avoid and/or minimize impacts to biological resources include:

- Proponents of new or modified facilities, or infrastructure constructed because of reasonably foreseeable compliance responses, would coordinate with State or local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local or State land use agency or governing body must follow all applicable environmental regulations as part of approval of a project for development.

- Based on the results of the environmental review, proponents would implement all feasible mitigation to reduce or substantially lessen the potentially significant biological resources impacts of the project.

- Actions required to mitigate potentially significant biological impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency.

    - Retain a qualified biologist to prepare a biological inventory of site resources prior to ground disturbance or construction. If protected species or their habitats are present, comply with applicable federal and State endangered species acts and regulations. Construction and operational planning will require that important fish or wildlife movement corridors or nursery sites are not impeded by project activities.

    - Retain a qualified biologist to prepare a wetland survey of onsite resources. This survey shall be used to establish setbacks and prohibit disturbance of riparian habitats, streams, intermittent and ephemeral

drainages, and other wetlands. Wetland delineation is required by Section 404 of the Clean Water Act and is administered by the U.S. Army Corps of Engineers.

- Prohibit construction activities during the rainy season with requirements for seasonal weatherization and implementation of erosion prevention practices.

- Prohibit construction activities in the vicinity of raptor nests during nesting season or establish protective buffers and provide monitoring, as needed, to address project activities that could cause an active nest to fail.

- Prepare site design and development plans that avoid or minimize disturbance of habitat and wildlife resources, and prevent stormwater discharge that could contribute to sedimentation and degradation of local waterways. Depending on disturbance size and location, a National Pollution Discharge Elimination System (NPDES) construction permit may be required from the California State Water Resources Control Board.

- Prepare spill prevention and emergency response plans, and hazardous waste disposal plans as appropriate to protect against the inadvertent release of potentially toxic materials.

- Plant replacement trees and establish permanent protection suitable habitat at ratios considered acceptable to comply with “no net loss” requirements.

- Contractor will keep the site and materials organized and store them in a way to prevent attracting wildlife by not creating places for wildlife to hide or nest (e.g., capping pipes, covering trashcans and emptying trash receptacles consistently and promptly when full).

Post-Mitigation Significance Determination

Because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this Final~~Draft~~ EA does not attempt to address project-specific details of mitigation, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant biological resources impacts.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this Final~~Draft~~ EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that construction-related impacts to biological resources

associated with the ~~Proposed~~Scoping Plan would be **potentially significant and unavoidable**.

b) Impact 4.b: Operational Impacts to Biological Resources

As summarized in Chapter 2, section D.2, the reasonably foreseeable compliance responses associated with the ~~Proposed~~Scoping Plan would require long-term operational changes. These operational changes are related to implementation of HFC reduction measures under SLCP reduction strategy, offset protocol associated with the Cap-and-Trade, new renewable energy projects associated with renewable energy and energy efficiency, including SB 350 measures and LCFS, and land use changes related to more stringent requirements under the LCFS regulation.

i. SLCP Measures

The HFC reduction measures under the SLCP Strategy contain actions to reduce HFC emissions within the State through replacing high-GWP HFCs, used as refrigerants, foam expansion agents, aerosol propellants, and to a lesser extent, as solvents and fire suppressants, with low-GWP compounds such as ammonia, CO_2, hydrocarbons, lower-GWP HFCs, and HFOs. This may require modifications to existing facilities.

As discussed in the previous section, incorporation of low-GWP refrigerants to existing residences and commercial buildings and facilities would not result in disturbance to plant and animal habitat or direct mortality of individuals as a result of construction-related activities.

However, operationally, HFO breakdown products include trifluoroacetic acid (TFA), a mildly phytotoxic, water soluble compound. TFA accumulates in the atmosphere and, due to its high solubility, is deposited on the earth's surface during precipitation events. TFA does not degrade easily by biological and non-biological physiochemical processes, or photochemical breakdown (Russel et. al. 2012). The use of HFO would increase rates of TFA formation, which could potentially accumulate in aquatic environments, including wetlands (Cahill et. al. 2001).

Under Section 612 of the Clean Air Act, U.S. EPA reviews substitutes (i.e., chemicals that may replace one that is currently in use for a specific purpose) within a comparative risk framework. This process is implemented through U.S. EPA's Significant New Alternatives Policy (SNAP) program, which provides an evolving list of alternatives. In more than twenty years since the initial SNAP rule was promulgated, U.S. EPA has modified the SNAP lists many times, most often by expanding the list of acceptable substitutes, but in some cases by prohibiting the use of substitutes previously listed as acceptable. U.S. EPA makes decisions informed by the overall understanding of the environmental and human health impacts as well as the current knowledge regarding available substitutes. When U.S. EPA is determining whether to add a new substitute to the list, they compare the risk posed by the new substitute to the risks posed by other

alternatives on the list and determine whether that specific new substitute poses more risk than already-listed alternatives for the same use. Section 612 provides that U.S. EPA must prohibit the use of a substitute where it has determined that there are other available substitutes that pose less overall risk to human health and the environment.

In March 2011, HFO-1234yf was approved as acceptable for use in new passenger cars and light-duty trucks under specific use conditions. As part of the approval process, public comments were received regarding the approval of HFO-1234yf on U.S. EPA's SNAP list. Several issues were addressed including potential environmental impacts, such as those described above associated with TFA's effects on algae. In response to these concerns, U.S. EPA summarized the issue and provided an overview of potential environmental effects. U.S. EPA determined that the projected maximum TFA concentration in rainwater and in surface water should not result in a significant risk of aquatic toxicology (76 Federal Register 17488) for the following stated reason:

> As [the U.S. EPA] developed the proposed rule, the data … relied on indicated that in the worst case, the highest monthly TFA concentrations in the area with the highest expected emissions, the Los Angeles area, could exceed the no observed adverse effect [level (NOAEL)] for the most sensitive plant species, but annual values would never exceed that value. Further, TFA concentrations would never approach levels of concern for aquatic animals (ICF 2009). In a more recent analysis, ICF (2010a, b, c, e) performed modeling for U.S. EPA using the kinetics and decomposition products predicted specifically for HFO-1234yf and considered revised emission estimates that were slightly lower than in a 2009 analysis (ICF 2009). The revised analysis found a maximum projected concentration of TFA in rainwater of approximately 1,700 ng/L, roughly one-thousandth of the estimate from our 2009 analysis (ICF 2010b). This maximum concentration is roughly 34 percent higher than the 1,264 ng/L reported by Luecken et al. (2009), reflecting the higher emission estimates we used (ICF 2010b). A maximum concentration of 1700 ng/L corresponds to roughly 1/600th of the NOAEL for the most sensitive algae species--thus, it is not a level of concern. We find these additional analyses confirm that the projected maximum TFA concentration in rainwater and in surface waters should not result in a significant risk of aquatic toxicity, consistent with our original proposal.

U.S. EPA's SNAP list considers substitutes based on their end use sector. That is, while HFO-1234yf is approved for use in new passenger cars and light-duty trucks, it would need to be reconsidered for use in other sectors such as commercial refrigeration. In addition, U.S. EPA may be petitioned to de-list alternatives from the SNAP list at any time. Thus, because use of HFOs must be subject to review and on-going monitoring under the U.S. EPA SNAP program, and must not pose a greater risk to the environment or human health than the chemical it is replacing, and would not be a substantial hazard to people or the environment.

ii. Cap-and-Trade Measure

Implementation of the ODS Offset Protocol would not include activities that would be located where biological resources exists (i.e., within buildings). Implementation of the Livestock Offset Protocol would include the operation of digesters at or adjacent to existing livestock operations where natural habitats are expected to be absent or limited. As such, staff expects the Livestock Offset Protocol would not substantially affect biological resources. The Urban Forest Offset Protocol recognizes tree improvement projects in urban settings; therefore, would not be expected to substantially affect biological resources (CARB 2010).

Under the Rice Cultivation Protocol, because variability in the timing and availability of flooded rice habitat is common and voluntary compliance responses would occur on a limited rather than widespread basis, staff does not expect that implementation of changes in cultivation practices would cause substantial adverse effects on bird species, and effects on other special status species (e.g., giant garter snake) (CARB 2014a).

Implementation of the U.S. Forest Offset Protocol would not increase total forest activities, but could shift activities to projects that increase carbon sequestration. Reforestation projects conducted under the U.S. Forest Offset Protocol have the potential to change existing habitat and disrupt wildlife. CARB's approach was to implement adaptive management to monitor and, where feasible, reduce any impacts identified (CARB 2010). However, since 2010 staff has reevaluated the potential for adverse habitat changes and disruption to wildlife, and staff no longer anticipates that projects conducted under the U.S. Forest Offset Protocol would have the potential to cause substantial changes to existing habitat and disruptions to wildlife (CARB 2014b).

The reasonably foreseeable compliance responses and impacts associated with implementation of offset protocols in Canada would be similar to those described above for mine methane capture and ODS projects. As discussed, there would not be substantial impacts related to ODS projects. Implementation of landfill projects in Ontario would involve installation of gas collection and control systems, which would require minor modifications to existing waste facilities, thus not substantially affecting natural habitats, sensitive species individuals, or other biological resources.

The MMC Protocol EA identified adverse impacts to biological resources because the installation of gas extraction, capture, transportation, processing, destruction, and monitoring equipment could cause direct and indirect impacts to special status species and habitats. These impacts could result from project-related activities such as operation of new equipment, interruption of water aquifers, and removal of water from abandoned mines. These types of impacts would be similar for mine methane capture projects in Canada. Thus, impacts on biological resources related to mine methane capture projects in the U.S. and Canada would be substantial.

iii. Renewable Energy and Energy Efficiency, Including SB 350 and LCFS Measures

Reasonably foreseeable compliance responses related to implementation of renewable energy and energy efficiency, including SB 350 measures and the LCFS measures could result in increased renewable energy projects. Operation of wind farms is likely to result in the direct mortality of birds and bats through collision with rotating turbines or transmission lines or trauma from turbulence or pressure changes surrounding the moving turbines. Direct mortality of many avian and bat species from turbines and transmission lines has been well documented. In some cases, high levels of avian mortality have resulted from operation of wind farms. Diurnal raptors are particularly susceptible to mortality from collision with wind turbines and transmission lines because of their large size and flight characteristics (Erickson et al. 2002). Better siting and turbine design has reduced wildlife mortality (CEC and DFG 2007); however, operation of wind-generating projects could result in the direct mortality of bird and bat species.

Wind farms could increase the risk of fire and result in impacts to biological resources. Major fire hazards include hardware and conductor failure, dropping of collection lines, turbine malfunction or mechanical failure, construction related accidents, access vehicle or electrocuted wildlife contact with dry vegetation.

The central environmental issue surrounding solar energy development is direct effects and habitat loss for desert tortoise and other sensitive desert wildlife. In addition, human activities in previously undeveloped areas potentially provide food or other attractants in the form of trash, litter, or water, which draw unnaturally high numbers of predators such as the common raven, kit fox, and coyote. Common raven populations in some areas of the Mojave Desert have increased 1,500 percent from 1968 to 1988 in response to expanding human use of the desert (Boarman 2002). Additional traffic along roadways may result in high numbers of wildlife mortality, which would provide an additional attractant and subsidy for opportunistic predators/scavengers such as ravens.

Biomass is waste and by-products that can be utilized as fuel for producing energy, instead of being put in landfills or burned. Three principal sources of biomass fuels are 1) agricultural residues, such as removed or pruned orchard trees, pits, or nut shells; 2) forestry residuals, including limbs, tree tops, small trees, and other slash removed during timber harvesting, forest fire fuel reduction, or forest thinning projects; and 3) urban and industrial wastes, such as construction/demolition wood, pallets, or landscaping tree trimming.

In general, forest projects that could create a biomass fuel source (e.g., timber harvest, fuel reduction or thinning project) can affect biological resources in the following ways. Habitat for special-status plants and animals may be altered by removal of understory vegetation and the forest community composition may change over time due to forest treatments. During vegetation removal, special-status plants or animals may be crushed or entombed during operation of mechanized equipment.

Roads created to access the project site may result in habitat loss or degradation from erosion, soil compaction and increased human disturbance. Sensitive habitats, including jurisdictional waters of the United States, may also be adversely affected during vegetation removal or creation of roads. Erosion and run-off may result in degradation of sensitive habitats. Important movement corridors or use of native nursery sites (such as maternal bat colony) may be impeded during implementation of forest projects.

In addition, operation of hydroelectric facilities and transmission lines may also affect biological or forest resources by altering natural hydrographs of streams, changing water temperature or water quality, inundating uplands by creating reservoirs or other water storage facilities, increasing nonnative species populations (e.g., bass or other warm water fishes and bullfrogs), and altering the predator-prey relationships.

These impact, as described above, could result in substantial adverse effects on biological resources.

iv. LCFS Measures

Implementation of the ~~Proposed~~Scoping Plan could result in more stringent requirements under LCFS that would decrease the overall average CI level of California's fuel pool. Increased stringency of LCFS under the ~~Proposed~~Scoping Plan would likely result in an increased demand for agricultural feedstocks, including sugarcane, sorghum, and soy. In some cases, this increase can be accomplished using marginal lands (i.e., lands unsuitable for food crops), or through the increased production of feedstocks on existing agricultural lands (e.g., using genetically modified crops designed for fuels). However, cultivation of biofuels on land currently used for food production could result in the conversion of additional existing forest, grassland, or other non-agricultural land to food-related agricultural uses. In addition, the use of distillers' grains for ethanol, which is often used to feed livestock, could increase pressure to grow additional crops for cattle and other animal-based agriculture.

CARB estimates the indirect land use change effects of biofuel crop production using the Global Trade Analysis Project (GTAP) model, which is a computer model developed and supported by researchers at Purdue University. Within the GTAP's scope, there are 111 world regions, some of which consist of single countries, others of which are comprised of multiple neighboring countries. Each region contains data tables that describe every national economy in that region, as well as all substantial intra- and inter-regional trade relationships. The data for this model are contributed and maintained by more than 6,000 local experts.

GTAP model analysis considers life cycle CI impacts related to potential or actual deforestation and conversion of other land use types. When a life cycle pathway is developed for a crop-based biofuel, an indirect land use change (iLUC) value is developed using the GTAP model for land that would be converted to agricultural production because of increased demand for that crop. The approach accounts for land

conversions in all regions of the world based on available land and likelihood of land to be converted as demand for land goes up. The methodology attributes new land to come from forest lands, pastureland, and cropland. A fuel that is more likely to displace sensitive lands, such as forests, would have a higher iLUC value, making it less attractive for use in complying with the LCFS regulation. However, while the models consider effects related to land use changes, they do not explicitly prohibit adverse effects on habitat or biodiversity, and there could still be substantial environmental impacts on biological resources.

Waste-derived biofuels would not require land conversion because they use waste biomass material from existing agricultural operations (i.e., no attendant deforestation) and are assigned "zero" iLUC values. Most gasoline contains up to 10 percent ethanol in the U.S. to meet oxygenation requirements. Instituting CI values for land use changes incentivize the production and use of renewable sources, such as waste-derived biofuels, and may decrease the potential for deforestation and other conversion of lands not currently in agricultural production. Thus, more stringent LCFS regulations under the ~~Proposed~~Scoping Plan would provide a disincentive for land use conversion, as these feedstocks would be less marketable due to increased CI values. Thus, the potential for land use conversion, and the related effects on biological species, would be decreased.

Depending on the type of crop, location, and need to convert lands, habitat destruction could occur, resulting in the loss of biodiversity. The location of new crop lands may affect conservation plans or disrupt important migratory routes. Indirect effects could occur as well, such as increased pesticide and nutrient use, the runoff of which could be detrimental to individual species.

Impact Significance Determination

For the reasons discussed above, impacts on biological resources could be potentially significant due to implementation of the reasonably foreseeable compliance responses associated with Cap-and-Trade offset protocols, changes in land uses associated with increased stringency of the LCFS regulation and new renewable energy projects related to renewable energy and energy efficiency, including SB 350 measures and LCFS measures.

Mitigation Measures

This impact could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of the CARB and not within its purview.

Mitigation Measure 4.b.i

As described above, impacts related to mine methane offset protocol projects would be reduced to a less-than-significant level through implementation of existing regulations, including SMCRA, the Clean Water Act, and the Soil and Water Resources Conservation Act. The U.S. federal government and CARB lack the authority to propose

or implement these, or similar laws. Thus, the authority to determine project-level impacts and applicable regulations lies with the permitting agency for individual projects. Further, the programmatic analysis does not allow project-specific details of mitigation, resulting in an inherent uncertainty in the degree of mitigation ultimately implemented to reduce the potentially significant impacts. As a result, no mitigation is available to reduce potentially significant impacts related to mine methane offset projects in Canada.

Mitigation Measure 4.b.ii: Implement Mitigation Measure 4.a

Mitigation Measure 4.b.iii: Implement Mitigation Measure 4.a

Post-Mitigation Significance Determination

Because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this Final~~Draft~~ EA does not attempt to address project-specific details of mitigation, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this Final~~Draft~~ EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that operational impacts to biological resources associated with the reasonably foreseeable compliance responses for Cap-and-Trade offset projects, renewable energy and energy efficiency, including SB 350 measures, and LCFS measures associated with the ~~Proposed~~Scoping Plan would be **potentially significant and unavoidable**.

5. Cultural Resources

a) Impact 5.a: Construction-Related and Operational Impacts to Cultural Resources

As summarized in Chapter 2, section D.1, the reasonably foreseeable compliance responses associated with the ~~Proposed~~Scoping Plan would require construction activities. These impacts address the building phase of both reasonably foreseeable construction of new facilities or modification of existing facilities that involve earth-moving activities.

Construction activities could require disturbance of undeveloped area, such as clearing of vegetation, earth movement and grading, trenching for utility lines, erection of new buildings, and paving of parking lots, delivery areas, and roadways. Demolition of existing structures may also occur before the construction of new buildings and structures. The cultural resources that could potentially be affected by ground disturbance activities include, but are not limited to, prehistoric and historical archaeological sites, tribal cultural resources, paleontological resources, historic buildings, structures, or archaeological sites associated with agriculture and mining, and

heritage landscapes. Properties important to Native American communities and other ethnic groups, including tangible properties possessing intangible traditional cultural values, also may exist. Historic buildings and structures may also be adversely affected by demolition-related activities. Such resources may occur individually, in groupings of modest size, or in districts. Because culturally sensitive resources can also be in developed settings; historic, archeological and paleontological resources, and places important to Native American communities, could also be adversely affected by construction of new facilities.

Properties important to Native American communities and other ethnic groups, including tangible properties possessing intangible traditional cultural values, also may exist. Historic buildings and structures may also be adversely affected by demolition-related activities. Such resources may occur individually, in groupings of modest size, or in districts. Because culturally sensitive resources can also be in developed settings, historic, archeological, and paleontological resources, and places important to Native American communities, could also be adversely affected by construction of new facilities.

New facilities constructed and ongoing earth-moving activities as a potential compliance response may be in a region where significant prehistoric or historic-era cultural resources may have been recorded and there remains a potential that undocumented cultural resources could be unearthed or otherwise discovered during ground-disturbing and construction activities. Prehistoric materials might include flaked stone tools, tool-making debris, stone milling tools, shell or bone items, and fire affected rock or soil darkened by cultural activities; examples of significant discoveries would include villages and cemeteries. Historic material might include metal, glass, or ceramic artifacts; examples of significant discoveries might include former privies or refuse pits (i.e., middens).

Impact Significance Determination

For the reasons discussed above, construction-related and operational impacts on cultural resources associated with implementation of the ~~Proposed~~Scoping Plan could be potentially significant.

Mitigation Measures

Potential impacts to cultural resources could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

Mitigation Measure 5.a

The Regulatory Setting in Attachment A includes applicable laws and regulations that provide protection of cultural resources. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of

jurisdictions with local or State land use approval and/or permitting authority. New or modified facilities in California would qualify as a "project" under CEQA. The jurisdiction with primary approval authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices that are routinely required to avoid and/or minimize impacts to cultural resources include:

- Proponents of new or modified facilities, or infrastructure constructed because of reasonably foreseeable compliance responses, would coordinate with State or local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local or State land use agency or governing body must follow all applicable environmental regulations as part of approval of a project for development.

- Based on the results of the environmental review, proponents would implement all feasible mitigation to reduce or substantially lessen the potentially significant impacts of the project. Actions required to mitigate potentially significant cultural impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency.

    - Retain the services of cultural resources specialists with training and background that conforms to the U.S. Secretary of Interior's Professional Qualifications Standards, as published in Title 36, Code of Federal Regulations, part 61.

    - Seek guidance from the State and federal lead agencies, as appropriate, for coordination of Nation-to-Nation consultations with the Native American Tribes.

    - Provide notice to Native American Tribes of project details to identify potential Tribal Cultural Resources (TCR). In the case that a TCR is identified, prepare mitigation measures that:

        - Avoid and preserve the resources in place,
        - Treat the resource with culturally appropriate dignity,
        - Employ permanent conservation easements, and
        - Protect the resource.

    - Consult with lead agencies early in the planning process to identify the potential presence of cultural properties. The agencies will provide the project developers with specific instruction on policies for compliance with the various laws and regulations governing cultural resources

management, including coordination with regulatory agencies and Native American Tribes.

- Define the area of potential effect (APE) for each project, which is the area within which project construction and operation may directly or indirectly cause alterations in the character or use of historic properties. The APE should include a reasonable construction buffer zone and laydown areas, access roads, and borrow areas, as well as a reasonable assessment of areas subject to effects from visual, auditory, or atmospheric impacts, or impacts from increased access.

- Retain the services of a paleontological resources specialist with training and background that conforms with the minimum qualifications for a vertebrate paleontologist as described in Measures for Assessment and Mitigation of Adverse Impacts to Non-Renewable Paleontologic Resources: Standard Procedures (Society of Vertebrate Paleontology 2010).

- Conduct initial scoping assessments to determine whether proposed construction activities would disturb formations that may contain important paleontological resources. Whenever possible potential impacts to paleontological resources should be avoided by moving the site of construction or removing or reducing the need for surface disturbance. The scoping assessment should be conducted by the qualified paleontological resources specialist in accordance with applicable agency requirements.

- The project proponent's qualified paleontological resources specialist would determine whether paleontological resources would likely be disturbed in a project area based on the sedimentary context of the area and a records search for past paleontological finds in the area. The assessment may suggest areas of high known potential for containing resources. If the assessment is inconclusive a surface survey is recommended to determine the fossiliferous potential and extent of the pertinent sedimentary units within the project site. If the site contains areas of high potential for significant paleontological resources and avoidance is not possible, prepare a paleontological resources management and mitigation plan that addresses the following steps:

  - a preliminary survey (if not conducted earlier) and surface salvage prior to construction;

  - physical and administrative protective measures and protocols such as halting work, to be implemented in the event of fossil discoveries;

- monitoring and salvage during excavation;
- specimen preparation;
- identification, cataloging, curation and storage; and
- a final report of the findings and their significance.

Post-Mitigation Significance Determination

Because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this Final~~Draft~~ EA does not attempt to address project-specific details of mitigation, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant cultural resources impacts.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this Final~~Draft~~ EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that construction-related and operational cultural resources impacts associated with the recommended measures under ~~Proposed~~Scoping Plan would be **potentially significant and unavoidable**.

6. Energy Conservation

a) Impact 6.a: Construction-Related Impacts to Energy Conservation

As summarized in Chapter 2, section D.1, the reasonably foreseeable compliance responses associated with the ~~Proposed~~Scoping Plan would require construction activities. These impacts address the building phase of both reasonably foreseeable construction of new facilities or modification of existing facilities that involve earth-moving activities.

Temporary increases in energy demand associated with the construction of new facilities would include fuels used during construction, and gas and electricity demands. Typical earth-moving equipment that may be necessary for construction includes: graders, scrapers, backhoes, jackhammers, front-end loaders, generators, water trucks, and dump trucks. While energy would be required to complete construction for any new or modified facilities or infrastructure projects, it would be temporary and limited in magnitude and would not be expected to exceed available energy supplies or result in the wasteful use of energy.

Impact Significance Determination

Therefore, construction-related impacts on energy conservation, associated with the ~~Proposed~~Scoping Plan, would be **less-than-significant**.

Mitigation Measures

No mitigation is necessary.

b) Impact 6.b: Operational Impacts to Energy Conservation

Implementation of the ~~Proposed~~Scoping Plan would effectively shift the use of petroleum-based fuels (i.e., gasoline and CARB diesel) to battery-electric, hydrogen and natural gas. It would also increase the demand and supply of non-renewable fuels and renewable energy.

Per Appendix F of the CEQA Guidelines (Cal. Code Regs., tit. 14, § 15000 et seq.), the wise and efficient use of energy includes:

1. Decreasing overall per capita energy consumption;
2. Decreasing reliance on fossil fuel such as coal, natural gas, and oil; and
3. Increasing reliance on renewable energy sources.

The ~~Proposed~~Scoping Plan contains the following programs: SLCP Reduction Strategy; State SIP Strategy measures; SB 375 Sustainable Community Strategies – Increased Stringency of 2035 Targets; LCFS – Increased Stringency (18 percent CI by 2030); renewable energy and energy efficiency, including SB 350 measures; and Post-2020 Cap-and-Trade Program with Declining Caps and Linkage to Ontario, Canada~~; and 20 Percent Reduction in GHGs at Refineries~~. As discussed in Chapter 2 of this Final~~Draft~~ EA, these programs would reduce energy demands, decrease reliance on fossil fuels and increase reliance on renewable energy sources.

Impact Significance Determination

Thus, the ~~Proposed~~Scoping Plan would support wise and efficient uses of energy, and would result in a **beneficial** long-term operational impact on energy conservation.

Mitigation Measures

No mitigation is necessary.

7. Geology, Seismicity, and Soil Resources

a) Impact 7.a: Construction-Related Impacts on Geology and Soil Resources

As summarized in Chapter 2, section D.1, the reasonably foreseeable compliance responses associated with the ~~Proposed~~Scoping Plan would require construction activities. These impacts address the building phase of both reasonably foreseeable construction of new facilities or modification of existing facilities that involve earth-moving activities.

Although it is reasonably foreseeable that construction and operational activities could occur, there is uncertainty as to the exact location of any new facilities or modification of existing facilities. Construction activities could require disturbance of undeveloped areas, such as clearing of vegetation, earth movement and grading, trenching for utility lines, erection of new buildings, and paving of parking lots, delivery areas, and roadways. Additional disturbance could result from the increased mineral ore extraction activities which would provide raw materials to these manufacturing facilities and energy projects. These activities would have the potential to adversely affect soil and geologic resources in construction or mineral ore extraction areas.

New facilities and infrastructure could be in a variety of geologic, soil, and slope conditions with varying amounts of vegetation that would be susceptible to soil compaction, soil erosion, and loss of topsoil during construction. The level of susceptibility varies by location. However, the specific design details, siting locations, and soil compaction and erosion hazards for manufacturing facilities are not known at this time and would be analyzed on a site-specific basis at the project level.

Impact Significance Determination

For the reasons described above, construction-related impacts to geology, seismicity, and soils associated with implementation of the ~~Proposed~~Scoping Plan could be potentially significant.

Mitigation Measures

Potential impacts to geology, seismicity, and soils could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

Mitigation Measure 7.a

The Regulatory Setting in Attachment A includes applicable laws and regulations that provide protection of geology, seismicity, and soils. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local or State land use approval and/or permitting authority. New or modified facilities in California would qualify as a “project” under CEQA. The jurisdiction with primary approval authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices that are routinely required to avoid and/or minimize impacts to geology and soils include:

- Proponents of new or modified facilities, or infrastructure constructed because of reasonably foreseeable compliance responses, would coordinate with State or local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements

(e.g., CEQA). The local or State land use agency or governing body must follow all applicable environmental regulations as part of approval of a project for development.

- Based on the results of the environmental review, proponents would implement all feasible mitigation to reduce or substantially lessen the potentially significant impacts of the project. Actions required to mitigate potentially significant geology and soil impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency.

    - Prior to the issuance of any development permits, proponents of new or modified facilities or infrastructure would prepare a geotechnical investigation/study, which would include an evaluation of the depth to the water table, liquefaction potential, physical properties of subsurface soils including shrink-swell potential (i.e., expansion), soil resistivity, slope stability, mineral resources, and the presence of hazardous materials.

    - Proponents of new or modified facilities or infrastructure would provide a complete site grading plan, and drainage, erosion, and sediment control plan with applications to applicable lead agencies. Proponents would avoid locating facilities on steep slopes, in alluvial fans and other areas prone to landslides or flash floods, or with gullies or washes, as much as possible.

    - Disturbed areas outside of the permanent construction footprint would be stabilized or restored using techniques such as soil loosening, topsoil replacement, revegetation, and surface protection (i.e., mulching).

Post-Mitigation Significance Determination

Because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this Final~~Draft~~ EA does not attempt to address project-specific details of mitigation, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts to geology, seismicity, and soils.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this Final~~Draft~~ EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that construction-related impacts to geology, seismicity, and soils associated with the ~~Proposed~~Scoping Plan would be **potentially significant and unavoidable**.

b) Impact 7.b: Operational Impacts to Geology and Soils Resources

As summarized in Chapter 2, section D.2, the reasonably foreseeable compliance responses associated with the ~~Proposed~~Scoping Plan would require long-term operational changes. These operational changes are related to implementation of methane reduction measures under SLCP, offset protocols associated with the Cap-and-Trade, and land use changes related to more stringent requirements under the LCFS regulation.

i. SLCP Measures

Manure management practices under the methane reduction measures would occur within existing dairy sites that are likely to contain substantial disturbance to soils. Changing manure practices, such as creating piles of manure or pasturing, could result in increased disturbance to geologic resources, such as compaction and loss of top soil due to trampling and reductions in vegetation. However, dairies are generally located in lands designated for agricultural use, where soil disruption is typical. Manure piles would be in discrete areas and moved once digestions is completed. Pasturing cattle typically occurs on a rotational schedule, and maintenance of vegetation is necessary for feeding. Thus, changes in manure management practices would not substantially affect soil resources.

Long-term operational impacts on geology and soils, associated with manure management practices related to the ~~Proposed~~Scoping Plan, would not be significant.

ii. Cap-and-Trade Measure

Under the post-2020 Cap-and-Trade Offset Protocols, eligible offset credits would be generated through projects that are in conformance with all applicable environmental, health, and safety regulations. Implementation of the ODS Offset Protocol would not include earth-moving activities or the operation of new buildings, and thus would not affect geology, soils and mineral resources. Implementation of the Livestock Offset Protocol would include the operation of digesters that would be subject to regulations considered sufficient to reduce potential adverse effects to geology and soil resources (CARB 2010). Implementation of the MMC Protocol could require the drilling of new methane drainage wells and boreholes, trenching for gathering pipelines, and other activities involving new ground disturbance and excavation. Some minor soil erosion impacts may result from the installation of new equipment; however, Offset Project Operators would be required to implement MMC projects in accordance with all federal, state and local regulations to control erosion, drainage, and grading pursuant to SMCRA, the Clean Water Act, the Soil and Water Resources Conservation Act and other similar laws, which are considered sufficient to reduce potential adverse effects to geology and soil resources (CARB 2013).

The reasonably foreseeable compliance responses and impacts associated with implementation of offset protocols in Canada would be similar to those described above for mine methane capture and ODS projects. As discussed, there would not be substantial impacts related to ODS projects. Implementation of landfill projects in

Ontario would involve installation of gas collection and control systems, which would require minor modifications to existing waste facilities, thus not substantially affecting geology, soils, and minerals. However, the noted regulations that would reduce the severity of impacts associated with mine methane capture projects, described above, do not apply to areas within Canada, and have authority only in areas within the U.S. and/or California. While Canadian federal, provincial, and municipal environmental laws contain some requirements like those associated with SMCRA, it is unknown where and under which jurisdiction individual projects may be located. Thus, the authority to determine project-level impacts and applicable regulations lies with the permitting agency for individual projects. Further, the programmatic analysis does not allow project-specific details of mitigation, resulting in an inherent uncertainty in the degree of mitigation that would ultimately need to be implemented to reduce the potentially significant impacts. Thus, implementation of mine methane capture projects may result in significant impacts on geology and soil resources.

iii. LCFS Measures

Implementation of the ~~Proposed~~Scoping Plan could result in increased stringency of the LCFS regulation. This could increase or change agricultural practices (see Section 2, Agriculture and Forest Resources). The detrimental effects of agricultural practices on soil quality include erosion, desertification, salinization, compaction, and pollution. Loss of topsoil can increase erosion rates and affect water quality, which may be exacerbated through increased use of nutrients and pesticides.

Soil erosion from farming threatens the productivity of agricultural land and causes several problems elsewhere in the environment. An average of 10 times as much soil erodes from American agricultural fields as is replaced by natural soil formation processes. Because it takes up to 300 years for 1 inch of agricultural topsoil to form, soil that is lost is essentially irreplaceable (Trautmann and Porter, 2012). The amount of erosion varies considerably from one field to another, depending on soil type, slope of the field, drainage patterns, and crop management practices; and the effects of the erosion vary also. Areas with deep organic loams are better able to sustain erosion without loss of productivity than are areas where topsoils are shallower.

Even when soil erosion is not excessive, intensive agriculture can impair soil quality by depleting the natural supplies of trace elements and organic matter. In natural ecosystems, soil fertility is maintained by the diverse contributions and recycling of nutrients by a wide range of plant and animal species. When this diversity is replaced by a single species grown year after year, some trace elements are depleted if not replaced by fertilization. The organic content of the soil also diminishes unless crop residues or other organic materials are supplied in sufficient quantities to replace that consumed over time.

Thus, for the reasons described above, long-term operational impacts associated with LCFS on geology, seismicity and soils could be significant.

Impact Significance Determination

For the reasons discussed above, impacts on geology, seismicity, and soils could be potentially significant due to implementation of the reasonably foreseeable compliance responses associated with Cap-and-Trade offset protocols, and changes in land uses associated with more stringent regulations under LCFS.

Mitigation Measures

This impact could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of the CARB and not within its purview.

Mitigation Measure 7.b.i

As described above, impacts related to mine methane offset protocol projects would be reduced to a less-than-significant level through implementation of existing regulations, including SMCRA, the Clean Water Act, and the Soil and Water Resources Conservation Act. The U.S. federal government and CARB lack the authority to propose or implement these, or similar laws. Thus, the authority to determine project-level impacts and applicable regulations lies with the permitting agency for individual projects. Further, the programmatic analysis does not allow project-specific details of mitigation, resulting in an inherent uncertainty in the degree of mitigation ultimately implemented to reduce the potentially significant impacts. As a result, no mitigation is available to reduce potentially significant impacts related to mine methane capture projects in Canada.

Mitigation Measure 7.b.ii

The Regulatory Setting in Attachment A includes applicable laws and regulations that provide protection of geology and soils. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local or State land use approval and/or permitting authority. New or modified facilities in California would qualify as a “project” under CEQA. The jurisdiction with primary approval authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices that are routinely required to avoid and/or minimize impacts to geology and soils include:

- Use no-till agriculture to reduce soil erosion.
- Avoid harvesting in areas with steep slopes.

- Identify and avoid areas with unstable slopes and local factors that can cause slope instability (groundwater conditions, precipitation, seismic activity, slope angles, and geologic structure).

- Identify soil properties, engineering constraints, and facility design criteria.

- Develop a site grading and management plan to identify areas of disturbance, areas of cut and fill, slope during and after grading, existing vegetation, and measures to protect slope, drainages, and existing vegetation in the project area.

- Develop an erosion control plan to delineate measures to minimize soil loss and reduce sedimentation to protect water quality.

- Design runoff control features to minimize soil erosion.

- Construct drainage ditches only where necessary.

- Use appropriate structures at culvert outlets to prevent erosion.

Post-Mitigation Significance Determination

Because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this Final~~Draft~~ EA does not attempt to address project-specific details of mitigation, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts to geology, seismicity, and soils.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this Final~~Draft~~ EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that operational impacts to geology and soil resources associated with offset protocols under the Cap-and-Trade Program and increased stringency of the LCFS regulation under the ~~Proposed~~Scoping Plan would be **potentially significant and unavoidable**.

8. Greenhouse Gases

a) Impact 8.a: Construction-Related and Operational Greenhouse Gas Impacts

As summarized in Chapter 2, section D.1, the reasonably foreseeable compliance responses associated with the ~~Proposed~~Scoping Plan would require construction activities. These impacts address the building phase of both reasonably foreseeable construction of new facilities or modification of existing facilities that involve earth-moving activities.

Overall, the ~~Proposed~~Scoping Plan would result in substantial long-term GHG reductions, although certain aspects of the ~~Proposed~~Scoping Plan would cause comparatively small short-term GHG emission increases.

Although it is reasonably foreseeable that construction activities associated with new or modified facilities could occur, there is uncertainty as to the exact location of any new facilities or the reconstruction or modification of existing facilities. Typical earth-moving equipment that may be necessary for these types of construction activities includes: graders, scrapers, backhoes, jackhammers, front-end loaders, generators, water trucks, and dump trucks. Specific, project-related construction activities would result in increased generation of GHG emissions associated with the use of heavy-duty off-road equipment, materials transport, and worker commutes for the duration of the construction phase. Therefore, construction-related GHG emissions are expected to be short-term and limited in amount.

Local agencies are generally charged with determining acceptable thresholds of GHG emissions, measured in metric tons of carbon dioxide equivalent per year (MT CO_2e/year). Quantification of construction-related GHG emissions is generally based on a combination of methods, including the use of exhaust emission rates from emissions models, such as OFFROAD 2007 and EMFAC 2011. These models require consideration of assumptions, including construction timelines and energy demands (e.g., fuel and electricity). However, most local agencies (e.g., air pollution control districts) do not recommend or require the quantification of construction-generated GHGs for typical construction projects because these only occur for a finite period of time (e.g., during periods of construction) that is typically much shorter than the operational phase. Thus, local agencies generally recommended that GHG analyses focus on operational phase emissions, as discussed below, unless the project is of a unique nature requiring atypical (e.g., large scale, long-term) construction activity levels (e.g., construction of a new dam or levee) for which quantification and consideration (e.g., amortization of construction emissions over the lifetime of the project) may be recommended.

The ~~Proposed~~Scoping Plan includes measures that are designed to decrease GHG emissions, therefore, implementation is anticipated to result in substantial long-term GHG reductions in California as shown in Figure II-2 in Chapter II of the ~~Proposed~~Scoping Plan. When construction-related GHG emissions associated with implementation of measures in the ~~Proposed~~Scoping Plan are considered in relation to the overall long-term operational GHG reduction benefits discussed in Chapter II of the ~~Proposed~~Scoping Plan, they are not considered substantial. Some of the known commitments ~~and recommended measures~~ in the ~~Proposed~~Scoping Plan could result in GHG emissions reductions in construction activities over time, due to ongoing efforts to reduce the carbon intensity of fuels (e.g., renewable diesel, low-emission diesel, and other fuel advancements), or incentives to increase the deployment of low- or near-zero and zero-emission vehicles across all vehicle classes.

Impact Significance Determination

Implementation of the ~~Proposed~~Scoping Plan would result in environmental benefits that include an estimated reduction in GHG emissions. These benefits would be greater than a comparatively small level of GHG emissions related to construction and operation of facilities associated with the compliance responses, as described above. As a result, implementation of the proposed strategy would result in a **beneficial** impact to GHG emissions.

Mitigation Measures

No mitigation is necessary.

9. Hazards and Hazardous Materials

a) Impact 9.a: Construction-Related Hazard Impacts

As summarized in Chapter 2, section D.1, the reasonably foreseeable compliance responses associated with the ~~Proposed~~Scoping Plan would require construction activities. These impacts address the building phase of both reasonably foreseeable construction of new facilities or modification of existing facilities that involve earth-moving activities.

These construction activities may require the transport, use, and disposal of hazardous materials. Construction activities generally use heavy-duty equipment requiring periodic refueling and lubricating fluids. Large pieces of construction equipment (e.g., backhoes, graders) are typically fueled and maintained at the construction site as they are not designed for use on public roadways. Thus, such maintenance uses a service vehicle that mobilizes to the location of the construction equipment. It is during the transfer of fuel that the potential for an accidental release is most likely. Although precautions would be taken to ensure that any spilled fuel is properly contained and disposed, and such spills are typically minor and localized to the immediate area of the fueling (or maintenance), the potential remains for a substantial release of hazardous materials into the environment. Consequently, construction activities could create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.

Impact Significance Determination

For the reasons described above, construction-related impacts on hazards and hazardous materials associated with implementation of the ~~Proposed~~Scoping Plan could be potentially significant.

Mitigation Measures

Potential impacts on hazards and hazardous materials could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

Mitigation Measure 9.a

The Regulatory Setting in Attachment A includes applicable laws and regulations that apply to accident-related hazards and risk of upset. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local or State land use approval and/or permitting authority. New or modified facilities in California would qualify as a "project" under CEQA. The jurisdiction with primary approval authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices that are routinely required to avoid upset and accident-related impacts include:

- Proponents of new, modified facilities, or infrastructure constructed because of reasonably foreseeable compliance responses, would coordinate with State or local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local or State land use agency or governing body must follow all applicable environmental regulations as part of approval of a project for development.

- Based on the results of the environmental review, proponents would implement all feasible mitigation to reduce or substantially lessen the potentially significant hazards and hazardous materials impacts of the project.

- Handling of potentially hazardous materials/wastes should be performed under the direction of a licensed professional with the necessary experience and knowledge to oversee the proper identification, characterization, handling and disposal or recycling of the materials generated because of the project. As wastes are generated, they would be placed, at the direction of the licensed professional, in designated areas that offer secure, secondary containment and/or protection from stormwater runoff. Other forms of containment may include placing waste on plastic sheeting (and/or covering with same) or in steel bins or other suitable containers pending profiling and disposal or recycling.

- The temporary storage and handling of potentially hazardous materials/wastes should be in areas away from sensitive receptors such as schools or residential areas. These areas should be secured with chain-link fencing or similar barrier with controlled access to restrict casual contact from non-project personnel. All project personnel that may encounter potentially hazardous materials/wastes will have the appropriate health and safety training commensurate with the anticipated level of exposure.

Post-Mitigation Significance Determination

Because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this Final~~Draft~~ EA does not attempt to address project-specific details of mitigation, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts on hazards and hazardous materials.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this Final~~Draft~~ EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that construction-related hazards and hazardous materials impacts associated with the ~~Proposed~~Scoping Plan would be **potentially significant and unavoidable**.

b) Impact 9.b: Operational Hazards and Hazardous Materials Impacts

As summarized in Chapter 2, section D.2, the reasonably foreseeable compliance responses associated with the ~~Proposed~~Scoping Plan would require long-term operational changes. These operational changes are related to implementation of methane reduction measures under SLCP reduction strategy, offset protocols associated with the Cap-and-Trade program, new renewable energy projects and fueling stations associated with renewable energy and energy efficiency, including SB 350 measures and LCFS, increased mining activities to meet battery demands under renewable energy and energy efficiency, including SB 350 measures and the State SIP Strategy measures, and land use changes related to more stringent requirements under the LCFS regulation.

i. SLCP Measures

The ~~Proposed~~Scoping Plan contains strategies to reduce methane, including the modification of existing wastewater treatment plants to include or expand anaerobic digesters, and the construction of dairy and organic waste digesters. Using anaerobic digestion, methane that would otherwise emit into the atmosphere is captured to fuel on- and off-site uses. The respiration of bacteria in an oxygen-free environment produces biogas, a gaseous mixture of methane and carbon dioxide. Unintentional releases of biogas from anaerobic digesters or pipelines could pose risks to human health and safety. For example, biogas could be released from a leak or rupture of a facility or one of the pipe segments. If the gas reaches a combustible mixture and an ignition source is present, a fire and/or explosion could occur, resulting in possible injuries and/or deaths.

Compliance with existing safety regulations and widely-accepted industry standards would minimize the hazard to the public and the environment. Operation of facilities would comply with the California fire code, local building codes (including requirements for the installation of fire suppression systems), and gas pipeline regulations. The local

fire agency would be responsible for enforcing the provisions of the fire code. The California Public Utilities Commission (CPUC) regulates the safety of gas transmission pipelines. Standard safety measures for anaerobic treatment facilities that would minimize the potential for exposure to biogas include leak detection systems, warning signals, and safety flares to reduce excess gas capacity. If released to the environment, methane would be dispersed rapidly in air, minimizing the hazards of exposure.

Operation of anaerobic digesters could result in risks to human health. The digesters are compressed to seal out oxygen to permit anaerobic respiration to occur. In the case that a person gained entry by accident, asphyxiation would occur; however, California Occupational Safety and Health Administration (Cal/OSHA) is responsible for enforcing workplace safety standards, which include confined space and lockout procedures (California Department of Resources Recycling and Recovery [CalRecycle] 2011).

Although there is uncertainty as to the exact locations of new anaerobic digesters and modifications to wastewater treatment plants and oil and gas facilities, these would likely occur within existing footprints or in areas with consistent zoning where hazardous materials are currently in use. Thus, implementation of the methane reduction measures would not be anticipated to result in locating new plants, stations, or modifications near schools, public (or public use) airports, private airstrips, or wildlands; or on sites included on a list of hazardous materials sites or impair implementation of or physically interfere with an adopted emergency response or evacuation plan. Thus, the potential for spills of hazardous materials that could affect the public or sensitive receptors (e.g., schools) would not be anticipated. In addition, as noted above, the handling of hazardous materials would be required to comply with all applicable federal, State and local laws.

Thus, the effect of hazards and hazardous materials because of implementation of the methane reduction measures under the ~~Proposed~~Scoping Plan would not be significant.

ii. Renewable Energy and Energy Efficiency, Including SB 350 and State SIP Strategy Measures

Implementation of the ~~Proposed~~Scoping Plan could result in increased mining to meet demands for greater supplies of lithium-based batteries and alternative fueling stations associated with renewable energy and energy efficiency, including SB 350 measures and the State SIP Strategy measures. Lithium metal batteries contain no toxic metals. The primary hazard posed by lithium batteries are their ability to overheat and ignite, and once ignited, the resulting fires can be especially difficult to extinguish. The likelihood to overheat or ignite is increased if the batteries are poorly packaged, damaged or exposed to a fire or a heat source. When packaged and handled properly, lithium batteries pose no environmental hazard (Pipeline and Hazardous Materials Safety Administration 2014).

In addition, lithium batteries may be recycled. For instance, several major power utilities are working with companies — including General Motors, Ford, Toyota, and Nissan — to explore the use of the batteries for stationary storage of the power produced in off-

peak periods by wind turbines and solar generation stations. Lithium-ion packs also are being tested as backup power storage systems for retail centers, restaurants and hospitals, as well as for residential solar systems (Edmunds 2014).

Also, with regards to battery fires and/or explosions, there are existing propulsion battery system safety documents that define evaluation methods and make recommendations for battery system performance. The Society of Automotive Engineers (SAE) Standard defines a minimum set of acceptable safety criteria for a lithium-based rechargeable battery system to be considered for use in a vehicle propulsion application as an energy storage system connected to a high voltage power train. The purpose of the SAE Standard is to assure that a battery pack can safely be integrated into an electric or hybrid vehicle. Specifically, it is designed to assure that a single point fault will not result in fire, explosion, battery enclosure rupture or high voltage hazard.

Implementation of the ~~Proposed~~Scoping Plan could result in increased installation of hydrogen fueling stations. Most new hydrogen fueling stations would be located at existing gasoline stations, adjacent to or on the same island as the gasoline dispenser. Although the gasoline and hydrogen dispensers look very similar, the nozzle and hose for the hydrogen dispenser are different. The hydrogen nozzles form an airtight connection with the hydrogen FCEV fuel tank and are not physically like gasoline nozzles (CARB 2015a). Thus, the release of hydrogen during fueling would not be expected to occur and result in a hazardous condition.

Hydrogen FCEV manufacturers developed and extensively safety-tested carbon-fiber hydrogen tanks, which can withstand environmental and man-made damage, including crash testing and ballistics. Hydrogen tanks are designed with multiple safety enhancements to prevent leaks in both routine use and extreme circumstances. Should a leak and subsequent ignition happen, the low radiant heat of a hydrogen fire and high diffusivity of hydrogen would reduce any potential damage, especially when compared to a gasoline fire.

However, design, construction, operational, and maintenance requirements for hydrogen fuel storage and handling systems in on-road vehicles are guided by standards prepared by the SAE. These standards provide performance-based requirements for verification of design prototype and production hydrogen storage and handling systems are also defined in this document. Complementary test protocols (for use in type approval or self-certification) to qualify designs (and/or production) as meeting the specified performance requirements are described. In addition, SAE provides requirements related to crashworthiness of hydrogen storage and handling systems. These requirements define recommended practices related to the integration of hydrogen storage and handling systems, fuel cell system, and electrical systems into the overall fuel cell vehicle (SAE 2013).

Thus, because lithium-ion batteries and hydrogen fuel cell systems are designed to substantially reduce the potential for hazardous conditions associated with transport, use and disposal, impacts would not be significant.

iii. LCFS Measure

Implementation of the ~~Proposed~~Scoping Plan could result in more stringent requirements under LCFS that would decrease the overall average CI level of California's fuel pool. Hazardous substances associated with fuels include exhaust or unburned fuel. Fuel vapors escape directly from automobile engines and gas tanks. They can also escape into the air during refueling, or when liquid fuel evaporates from a spill. Fuels can enter lakes and reservoirs through accidental spills or from motorized boats and personal watercraft. Fuels spilled on the ground or leaking from fuel storage tanks can contaminate groundwater. Substances in airborne engine exhaust settle directly onto water, soil and vegetation, or they can be washed down onto these surfaces when it rains. Also, fuel components are released into the environment during oil drilling, refining and transportation.

Gasoline and diesel fuels blends contain toxic substances that can enter the environment and cause adverse health effects in people. Some of these substances, such as benzene, toluene, and xylenes, are found in crude oil and occur naturally in fuels and their vapors. Other substances, such as 1,3-butadiene and formaldehyde, are formed in engines during combustion and are only present in exhaust. Other harmful pollutants found in engine exhaust include particulate matter (known more commonly as soot), NO_x, CO, sulfur dioxide, and various hydrocarbons. Ozone, the major component of urban smog, is formed when nitrogen oxides react in sunlight with hydrocarbons.

People are exposed to gasoline and diesel exhaust when they drive or ride in a vehicle, jog or bike along roads, or park in a public garage. Motorists are further exposed to gasoline vapors when they fill up their vehicle's fuel tank. People who work in or live near freeways, refineries, chemical plants, loading and storage facilities or other places that handle crude oil and petroleum products may be exposed to higher levels of fuel components than the public and face higher health risks.

Both liquid gasoline and motor vehicle exhaust contain chemicals that can cause cancer. Benzene, a fundamental component of gasoline and diesel fuel as well as vehicle exhaust, causes cancer in humans. Gasoline exhaust also contains cancer-causing 1,3-butadiene, formaldehyde, and acetaldehyde. Diesel exhaust contains several dozen toxic substances and scientific studies have shown that workers exposed to diesel exhaust are more likely to develop lung cancer. Long-term exposure to particles in diesel exhaust poses the highest cancer risk of any TAC (OEHHA 2007).

All internal combustion engine vehicles have the potential to release chemicals into the environment. These releases may occur as emissions to the air during fuel combustion, as well as through spills and leaks during fueling and vehicle use. Low-carbon fuels and alternative diesels that would be imported into California would require storage.

Underground storage tanks (USTs) can degrade over time, and could result in accidental release into the environment.

However, regulations limit the amount of fuel-related chemicals that may be released in the environment. EPA regulates diesel fuel under two programs: one under the Office of Pollution Prevention and Toxic Substances, which requires that all chemicals produced in the U.S. be registered under the Toxic Substances Control Act; the other is administered under the Transportation and Air Quality group as the Fuels and Fuel Additive program, which requires that all fuels sold for ground transportation purposes in the U.S. must be registered with the EPA and the volume produced reported on a quarterly basis. The California State Water Resources Control Board (SWRCB) regulates the storage of fuels in UST. The Office of the State Fire Marshal regulates diesel and biodiesel storage, dispensing, and vapor recovery. All diesel and biodiesel facilities must follow California building and fire code and adhere to the specific provisions regarding diesel and biodiesel.

Biofuel processing plants use various hazardous materials to create finished products. Each plant is responsible for determining if each waste stream is hazardous and managing it appropriately. Hazardous materials typically used at biofuel processing plants include the following.

(a) Spent Filter Media

Spent filter media such as diatomaceous earth, filter aid, and socks can be ignitable. Spent filter media with high moisture content (from oil or biodiesel) can spontaneously combust. It is the responsibility of the facility to operate its plant in a manner that would not generate ignitable waste filter media. If the material is hazardous, the facility may manage the ignitable waste as a useful product and avoid Resource Conservation and Recovery Act (RCRA) regulation. Using the waste as a fuel is not a legitimate use under the regulations, unless the fuel is an actual product that results from the process. The facility may also dispose of the ignitable filter media as a hazardous waste at a permitted treatment, storage, or disposal facility. If the waste filter media is not hazardous, the facility may manage it as a solid waste.

(b) Waste Glycerin

Waste glycerin can be ignitable or corrosive, or both. In addition, glycerin has a very high biochemical oxygen demand. While this does not make it a hazardous waste, it does present a threat to streams and lakes if disposed upon the land. This could also disrupt the wastewater treatment system’s biological process into which the waste glycerin is disposed.

(c) Spent or Unused Catalyst

Catalysts (and catalyst neutralizers) used in biodiesel production are acidic or caustic, thus the waste is potentially corrosive. Any spent catalyst (or other waste material) with a pH greater than or equal to 12.5, or less than or equal to 2, is a hazardous waste. Like waste methanol, waste catalyst is not subject to RCRA if it is returned to the process in

a closed-loop system, but it would be a hazardous waste outside a closed-loop system until it was returned to the process.

(d) Wastewater

Wastewater disposed under the authority of a valid Clean Water Act (CWA) permit is not regulated under RCRA. However, if wastewater contains a listed hazardous waste or exhibits a hazardous characteristic, it must be managed as a hazardous waste until treated or disposed in the CWA-permitted process. Biodiesel wastewater could be hazardous if it has high or low pH from catalyst disposed in the wastewater, contains high concentrations of methanol that would make it ignitable, or contains other listed or characteristic wastes.

(e) Spent or Unwanted Laboratory Chemicals

A variety of chemicals are used in laboratories. If these chemicals are listed as a hazardous waste or fail the Toxicity Characteristic Leaching Procedure toxicity levels at 40 CFR Section 261.24, they are a hazardous waste when disposed. Some unused chemicals destined for disposal may be listed under 40 CFR Section 261.33 and thus "acute hazardous wastes." When calculating monthly waste generation rates, one kilogram of P-listed wastes generated during a month would make the facility a large quantity generator, and subject to permitting as discussed in Attachment A.

Additive chemicals would need to be introduced into biodiesel blends to control oxidation, corrosion, foaming, cold temperature flow properties, biodegradation, water separation, and NO_X formation. There are several classes of additives, and some perform multiple functions when blended in fuel. The broad classes of additives include:

- Foam inhibitor - Generally a silicone-based compound that is essentially insoluble in fuel and affects bubble rupture (foam bubble destruction) in the fuel.

- Antioxidant - Chemical compounds that are either phenolic or aminic based that prevent peroxide formation in fuel during long term or high temperature storage.

- Lubricity Improver - A polar compound generally derived from fatty acids that provide protection against metal to metal wear within a fuel system. These can be esters, fatty acids, or amines for the most part.

- Corrosion Inhibitor - This additive prevents corrosion of fuel system components, mainly exposed reactive metal surfaces such as non-coated steel.

- Deposit Control Additive - This additive is either a detergent or dispersant additive that helps remove deposits that may form during high temperature exposure of fuel to the fuel system. These deposits generally form on or near the injector tip or spray holes.

- Conductivity Improver - Fuels that are hydroprocessed generally do not contain components that conduct static charge from the bulk fuel to the walls of storage tanks. Accumulated charge can cause static discharge and either damage equipment or cause fires.

- Water Separation Additive - Promotes separation of water from fuel. Low Temperature Flow Improver - Improved low temperature performance of fuel by modifying wax crystal structure of waxy components of fuel.

- Cetane improver (i.e., di-tert butyl peroxide) - Additive that raises cetane of fuel by modifying ignition properties of fuel.

- Biocide - Inhibits biological growth in fuel that is exposed to water.

Additives would be needed for formulating diesel fuels to meet fit-for-purpose requirements. In addition to the provisions of providing energy for operating an engine, a fuel must also:

- not foam when fueling;

- not spark and/or cause fires or explosions when fueling;

- be stable for long term storage;

- not form deposits in the fuel injection system;

- provide lubricity to moving parts within the fuel system; and

- not form deposits in the injection components including the inside and outside of the fuel injector.

Implementation of the proposed measure to increase the stringency of the LCFS regulation, to the extent that such implementation might attract the entry of new fuels into the California market, would be subject to Multimedia Evaluation reports. These reports have concluded that, in general, life cycle pollutant emissions from pure biodiesel are considerably lower than life cycle pollutant emissions from petroleum-derived fuels. In addition, additives that could be used in low-carbon fuels are likely to be like those used in existing fuels (i.e., ultra-low-sulfur diesel), and are, therefore, not anticipated to pose a substantially increased risk to the environment. Furthermore, as the biodiesel industry and market become more developed, additional evaluations will be prepared to address issues including:

- investments to improve the knowledge base;

- formulation of processes used to collect and manage new information;

- formulation of processes to evaluate and communicate uncertainty; and
- adjustment of the risk assessment process to mitigate the practical impacts of uncertainty on decision-making.

Ethanol is a volatile, flammable, colorless liquid and has a strong characteristic odor. It is easily ignited by heat, sparks, or flames. Thus, if an accident were to occur during transport, hazardous consequences could result. While ethanol is currently transported for use in fuels, implementation of the recommended measures to increase the stringency of the LCFS regulation could alter the transportation patterns, reflecting different quantities or locations of sources.

Transport of hazardous materials, including gasoline, diesel, and biofuels are regulated under the Federal Department of Transportation (DOT), which requires the safe and reliable transportation of hazardous materials by all modes. DOT's Hazardous Materials Regulations govern the transportation of ethanol and other biofuels and blends by rail, air, motor carrier, and barge. In addition, the DOT lists and classifies those materials that are designated as hazardous materials for purposes of transportation and prescribes the requirements for shipping papers, package marking, labeling, placarding, emergency response, training, and safety and applicable to the shipment and transportation of those hazardous materials. Requirements for carriage by rail, including operating, loading, and unloading requirements, along with detailed requirements for Class 3 (flammable liquid) materials are provided as well in the DOT's Hazardous Materials Regulations.

Regardless of the location of origin, transportation route, or end use, hazardous materials are regulated through various programs. Thus, measures that would increase the stringency of the LCFS regulation would not be expected to increase potential hazards and hazardous materials impacts associated with the transportation, use, and disposal of fuels.

iv. Cap-and-Trade Measure

Under the post-2020 Cap-and-Trade Offset Protocols, eligible offset credits would be generated through projects that are in conformance with all applicable environmental, health, and safety regulations. Offset projects implemented under the proposed offset protocols may result in the use or transport of hazardous materials that require special handling and disposal. All projects would be required to comply with established local, state, and federal laws pertaining to the use, storage, and transportation of these materials. Assuming compliance with applicable laws and regulations, the impacts would not result in a substantial risk of accidental upset or spill of hazardous materials (CARB 2010, CARB 2013, CARB 2014a). Implementation of mine methane capture projects would not result in substantial new hazards due to implementation of local, state, and federal laws pertaining to the use, storage, and transportation of these materials (CARB 2013).

The reasonably foreseeable compliance responses and impacts associated with implementation of offset protocols in Canada would be similar to those described above for mine methane capture and ODS projects. As discussed, there would not be substantial impacts related to ODS projects. Implementation of landfill projects in Ontario would involve installation of gas collection and control systems, which would require minor modifications to existing waste facilities, which would not increase the use of hazardous materials or affect existing hazards within a project site. However, the noted regulations that would reduce the severity of impacts associated with mine methane capture projects, described above, do not apply to areas within Canada, and have authority only in areas within the United States and/or California. While Canadian federal, provincial, and municipal environmental laws contain some requirements like those associated with SMCRA, it is unknown where and under which jurisdiction individual projects may be located. Thus, the authority to determine project-level impacts and applicable regulations lies with the permitting agency for individual projects. Further, the programmatic analysis does not allow project-specific details of mitigation, resulting in an inherent uncertainty in the degree of mitigation that would ultimately be implemented to reduce the potentially significant impacts. Thus, hazards and hazardous materials impacts could be significant related to implementation of mine methane capture offset projects in Canada.

Impact Significance Determination

For the reasons discussed above, operational hazards and hazardous materials impacts could be potentially significant due to implementation of the reasonably foreseeable compliance responses associated with Cap-and-Trade mine methane capture offset projects in Canada.

Mitigation Measures

This impact could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of the CARB and not within its purview.

Mitigation Measure 9.b.i

As described above, impacts related to mine methane offset protocol projects would be reduced to a less-than-significant level through implementation of existing regulations, including SMCRA, the Clean Water Act, and the Soil and Water Resources Conservation Act. The U.S. federal government and CARB lack the authority to propose or implement these, or similar laws within Canada. Thus, the authority to determine project-level impacts and applicable regulations lies with the permitting agency for individual projects in Canada. Further, the programmatic analysis does not allow project-specific details of mitigation, resulting in an inherent uncertainty in the degree of mitigation ultimately implemented to reduce the potentially significant impacts. As a result, no mitigation is available to reduce potentially significant impacts related to mine methane capture projects in Canada.

Post-Mitigation Significance Determination

Because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this Final~~Draft~~ EA does not attempt to address project-specific details of mitigation, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this Final~~Draft~~ EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that the potentially significant operational hazards and hazardous materials impacts associated with mine methane capture offset protocols in Canada would be **potentially significant and unavoidable**.

10. Hydrology and Water Quality

a) Impact 10.a: Construction-Related Impacts to Hydrology and Water Quality

As summarized in Chapter 2, section D.1, the reasonably foreseeable compliance responses associated with the ~~Proposed~~Scoping Plan would require construction activities. These impacts address the building phase of both reasonably foreseeable construction of new facilities or modification of existing facilities that involve earth-moving activities.

Construction activities could require disturbance of undeveloped areas, such as clearing of vegetation, earth movement and grading, trenching for utility lines, erection of new buildings, and paving of parking lots, delivery areas, and roadways. Construction, grading and trenching have the potential to result in adverse soil erosion resulting in sedimentation and degradation of local waterways. Specific construction projects would be required to comply with applicable erosion, water quality standards, and waste discharge requirements (e.g., NPDES, stormwater pollution prevention plan [SWPPP]). With respect to depleting groundwater supplies, impairing quality, and runoff issues, construction of new facilities would not be anticipated to result in substantial demands due to the nature of associated activities. However, depending on the location of construction activities, there could be adverse effects on drainage patterns and exposure of people or structures to areas susceptible to flood, seiche, tsunami, or mudflow.

Impact Significance Determination

For the reasons described above, construction-related impacts on hydrology and water quality associated with implementation of the ~~Proposed~~Scoping Plan could be potentially significant.

Mitigation Measures

Potential impacts on hydrological resources could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

Mitigation Measure 10.a

The Regulatory Setting in Attachment A includes applicable laws and regulations regarding hydrology and water quality CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local or State land use approval and/or permitting authority. New or modified facilities in California would qualify as a "project" under CEQA. The jurisdiction with primary approval authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices that are routinely required to avoid and/or mitigate hydrology and water quality-related impacts include the following:

- Proponents of new or modified facilities, or infrastructure constructed because of reasonably foreseeable compliance responses, would coordinate with State or local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local or State land use agency or governing body must follow all applicable environmental regulations as part of approval of a project for development.

- Based on the results of the environmental review, proponents would implement all feasible mitigation to reduce or substantially lessen the potentially significant impacts of the project. Actions required to mitigate potentially significant hydrology and water quality impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency.

    - Under the oversight of the local lead agency, prior to issuance of any construction permits, the proponents for the proposed renewable energy project would prepare a stormwater drainage and flood control analysis and management plan. The plans would be prepared by a qualified professional and would summarize existing conditions and the effects of project improvements, and would include all appropriate calculations, a watershed map, changes in downstream flows and flood elevations, proposed on- and off-site improvements, features to protect downstream uses, and property and drainage easements to accommodate downstream flows from the site. Project drainage

features would be designed to protect existing downstream flow conditions that would result in new or increased severity of offsite flooding.

- Establish drainage performance criteria for off-site drainage, in consultation with county engineering staff, such that project-related drainage is consistent with applicable facility designs, discharge rates, erosion protection, and routing to drainage channels, which could be accomplished by, but is not limited to: (a) minimizing directly connected impervious areas; (b) maximizing permeability of the site; and, (c) stormwater quality controls such as infiltration, detention/retention, and/or biofilters; and basins, swales, and pipes in the system design.

- The project proponent would design and construct new facilities to provide appropriate flood protection such that operations are not adversely affected by flooding and inundation. These designs would be approved by the local or State land use agency. The project proponent would also consult with the appropriate flood control authority on the design of offsite stream crossings such that the minimum elevations are above the predicted surface-water elevation at the agency's designated design peak flows. Drainage and flood prevention features shall be inspected and maintained on a routine schedule specified in the facility plans, and as specified by the county authority.

- As part of subsequent project-level planning and environmental review, the project proponent shall coordinate with the local groundwater management authority and prepare a detailed hydrogeological analysis of the potential project-related effects on groundwater resources prior to issuance of any permits. The proponent shall mitigate for identified adverse changes to groundwater by incorporating technically achievable and feasible modifications into the project to avoid offsite groundwater level reductions, use alternative technologies or changes to water supply operations, or otherwise compensate or offset the groundwater reductions.

Post-Mitigation Significance Determination

Because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this Final~~Draft~~ EA does not attempt to address project-specific details of mitigation, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this Final~~Draft~~ EA takes the

conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that construction-related impacts on hydrology and water quality associated with the ~~Proposed~~Scoping Plan would be **potentially significant and unavoidable**.

b) Impact 10.b: Operational Impacts to Hydrology and Water Quality

As summarized in Chapter 2, section D.2, the reasonably foreseeable compliance responses associated with the ~~Proposed~~Scoping Plan would require long-term operational changes. The operational changes that could affect hydrology and water quality are related to the Cap-and-Trade offset protocols, methane reduction measures under SLCP, increased mining for lithium related to increased battery demand under renewable energy and energy efficiency, including SB 350 measures and the State SIP Strategy measures, land use changes associated with LCFS, and new renewable energy projects implemented under renewable energy and energy efficiency, including SB 350 measures and LCFS measures.

i. SLCP Measures

Modifications to oil and gas facilities would not involve an increased use of water resources nor result in the contamination of surface and groundwater. These activities would be minor. Further, improvements to oil and gas facilities would reduce leaks of methane and oil which could otherwise contaminate sources of surface and groundwater. By preventing leaks from occurring, water quality would be maintained or improved.

Flush-water lagoon management systems are currently used by most dairy farmers in California. The process requires large quantities of water to sweep manure into a localized area, or lagoon, where it undergoes anaerobic decomposition. The liquid manure effluent is then diluted with irrigation water (typically groundwater) and applied to fields and croplands by way of flood irrigation. Under the ~~Proposed~~Scoping Plan, dairy operators could implement scrape manure management systems, which when combined with more water-efficient irrigation practices would require substantially less water than flush-water management (which typically requires water-inefficient flood irrigation). Thus, the potential for decreasing groundwater supplies would be reduced with scrape manure management systems compared to flush-water lagoon management systems.

Dairy operators may also implement digester facilities. Anaerobic digesters (i.e., dairy digesters, wastewater treatment plants, organic waste digesters) could result in the contamination of local waterways and groundwater resources. Dairy manure contains nutrients, organic matter, salts, microorganisms, pathogens, and fecal bacteria. If improperly managed, constituents and/or byproducts of anaerobic digestion could continue to pollute water quality by contributing excess nutrients, bacterial pathogens, and oxygen-demanding materials (RWQCB 2010). Application of improperly treated digestate and/or improper application timing or rates of digestate to agricultural land may lead to increased nitrogen oxide emissions, soil contamination, and/or nutrient

leaching. However, Wastewater Discharge Requirements (WDRs) are required for each facility to address surface water discharges of digestate or manure constituents. In addition, regulations prohibit surface water discharges (unless covered by an NPDES permit), appropriate setbacks for facilities from surface water bodies, lined detention ponds, application of digestate at agronomic rates to surrounding lands, and implementation of a groundwater monitoring system to detect when leaks occur.

Finally, dairy operators may pasture cattle herds or store manure on-site to reduce methane emissions from manure. Pasturing of cattle and drying of manure on-site may result in contamination of groundwater and discharge of contaminates into surface water. Irrigation needs required to maintain pastures, and rain events, may increase rates of polluted runoff that can result in adverse water quality. The extent to which adverse water quality effects could occur depends on various factors including unique hydrology, topography, climate, and land uses of specific regions. However, dairies that could be converted from lagoon-based manure management systems to pasture or open drying systems, because of implementation of the ~~Proposed~~Scoping Plan, contain physical features (e.g., no off-property discharge) and/or have obtained appropriate permits (e.g., NPDES, WDRs). Physical features of specific properties and permit requirements would ensure that there would not be substantial adverse effects related to water quality.

Thus, impacts associated with hydrology and water quality related to the SLCP reduction measures, under the ~~Proposed~~Scoping Plan, would not be substantial.

ii. Renewable Energy and Energy Efficiency, Including SB 350 and State SIP Strategy Measures

Implementation of the ~~Proposed~~Scoping Plan could result in increased mining to meet demands for greater supplies of lithium-based batteries associated with renewable energy and energy efficiency, including SB 350 measures and the State SIP Strategy measures. Mining of hard rock would require the use of conventional mining practices including the creation of underground mines and open pits, which would result in the removal of organic material (e.g., bedrock, vegetation). Additionally, lithium can be collected from continental brines found in basins. Salty groundwater is pumped into lagoons where it undergoes evaporation producing salts containing lithium compounds.

Discharge of water from mining operations is regulated by state and federal statutes, such as the Clean Water Act and Safe Drinking Water Act. Mining operations are required to obtain several permits, which set guidelines for controlling water pollution through establishment of discharge standards. These permits include NPDES permits (which regulate point sources for pollution) and SWPPP in case of overflow. These permits set limits on the amounts of particular substances that can be discharged in water to protect public and environmental health. Thus, impacts on hydrology and water quality associated with increase lithium mining would not be substantial.

iii. Cap-and-Trade Measure

Under the post-2020 Cap-and-Trade Offset Protocols, eligible offset credits would be generated through projects that are in conformance with all applicable environmental, health, and safety regulations. Implementation of the ODS Offset Protocol project would occur within existing buildings, and would therefore not result in adverse effect on hydrology and water quality (CARB 2010). Implementation of the Livestock Offset Protocol would include the operation of digesters that would be subject to requirements set forth by the relevant regional water quality control boards (i.e., waste discharge requirements), which would ensure that appropriate preventative design, operation, and monitoring requirements are in place to prevent substantial and adverse effects on surface and groundwater quality (CARB 2010). Implementation of the Rice Cultivation Protocol would change irrigation and drainage timing, but not result in substantial changes to hydrology and water quality because practices would remain generally the same as the existing conditions within an individual site (CARB 2014a). Implementation of the Urban Forest Offset Protocol would result in only minor soil disturbance and would not substantially affect hydrology or water quality. Implementation of the U.S. Forest Offset Protocol would not increase total forest activities, but could shift activities to projects that increase carbon sequestration. Because the overall level of forest activities would not change, there would not be substantial effects on hydrology and water quality (CARB 2010).

Implementation of the MMC Protocol may include drilling of new methane drainage wells and boreholes. Drilling and well development can result in the removal of substantial amounts of groundwater resulting from drawdown of water in the coalbed. The groundwater extracted during drilling, known as produced water, must be treated and disposed of properly or risk contamination of soils or surface waters. In addition, operation of a methane drainage well would continue to create produced water. All projects implemented under the MMC Protocol must be in accordance with all applicable federal, state, and local regulations and regulatory oversight requirements to be issued credits for emission reductions. Consequently, the potential impacts to hydrology and water quality would not be substantial due to the required compliance with laws and regulations (CARB 2013).

The reasonably foreseeable compliance responses and impacts associated with implementation of offset protocols in Canada would be similar to those described above for mine methane capture and ODS projects. As discussed, there would not be substantial impacts related to ODS landfill projects. Implementation of landfill projects in Ontario would involve installation of gas collection and control systems, which would require minor modifications to existing waste facilities, thus not affecting hydrology or water quality of an individual project site. However, the noted regulations that would reduce the severity of impacts associated with mine methane capture projects, described above, do not apply to areas within Canada, and have authority only in areas within the United States and/or California. While Canadian federal, provincial, and municipal environmental laws contain some requirements like those associated with SMCRA, it is unknown where and under which jurisdiction individual projects may be located. Thus, the authority to determine project-level impacts and applicable

regulations lies with the permitting agency for individual projects. Further, the programmatic analysis does not allow project-specific details of mitigation, resulting in an inherent uncertainty in the degree of mitigation that would ultimately be implemented to reduce the potentially significant impacts. Thus, hydrology and water quality impacts could be significant, related to implementation of mine methane capture offset projects in Canada.

iv. LCFS Measure

Implementation of the ~~Proposed~~Scoping Plan could result in more stringent requirements under LCFS that would decrease the overall average CI level of California's fuel pool. Implementation of these new fuel standards under the ~~Proposed~~Scoping Plan could alter the demand for fuels feedstocks, resulting in changes in location and types of fuel-based agricultural production. Ethanol supplies could shift somewhat from corn-based ethanol to cane, sorghum, cellulosic and molasses. The potential shift could affect agriculture-based ethanol pathways, resulting in a potential decrease in shipments of corn ethanol from within California and elsewhere in the United States and an increase in shipments of sugarcane and molasses ethanol from Brazil and Central America. Increased cultivation of fuel-based agriculture could displace land currently used for row crops, orchards, and grazing.

The U.S. has more than 330 million acres of agricultural land that produce an abundant supply of food and other products. American agriculture is noted worldwide for its high productivity, quality, and efficiency in delivering goods to the consumer. However, if improperly managed, activities from working farms and ranches can affect water quality. Agricultural nonpoint source (NPS) pollution affects water quality of rivers and lakes, wetlands, and contributes to contamination of estuaries and ground water. Agricultural activities that cause NPS pollution include poorly located or managed animal feeding operations; overgrazing; plowing too often or at the wrong time; and improper, excessive, or poorly timed application of pesticides, irrigation water, and fertilizer.

Pollutants that result from farming and ranching include sediment, nutrients, pathogens, pesticides, metals, and salts. Impacts from agricultural activities on surface water and ground water can be minimized by using management practices that are adapted to local conditions. In addition, GTAP analysis includes indirect effects of increased pesticide and nutrient use. Because the increased use of pesticides results in increased CI values, implementation of a more stringent LCFS regulation could discourage increased chemical use for cultivation of agriculture-based fuels.

In general, farmers may employ best management practices (BMPs) to reduce runoff associated with agricultural practices. BMPs vary from state to state and among countries because "best" can be a highly subjective and site-specific label. For example, a practice may be considered best in one area (e.g., coastal plain) but inappropriate in another area (e.g., mountains). Criteria for determining what is best may include extent of pollution prevention or pollutant removal, ease of implementation, ease of maintenance and operation, durability, attractiveness to landowner (i.e., willingness of farmers to implement the practice in a voluntary program), cost, and cost-effectiveness.

Regardless, implementation of a more stringent LCFS regulation could result in adverse effects on water quality. Thus, there could be significant effects on hydrology and water quality related to changes in land use resulting from implementation of new fuels regulations.

v. Renewable Energy and Energy Efficiency, Including SB 350 and LCFS Measures

Implementation of renewable energy and energy efficiency, including SB 350 measures and increased stringency of LCFS would increase the number of renewable energy projects. Operation of these facilities may result in adverse effects on hydrology and water quality as discussed below.

(a) Solar Thermal

Solar thermal facilities may use substantial quantities of water for long-term operations including steam generation, evaporative cooling of the power generation units, periodic washing of the mirror panels to maintain their efficiency, dust control around the site, and domestic consumption by the work force. In areas, such as arid desert regions of the southwest U.S. where available surface water is limited, the construction and operation of solar thermal facilities may result in the need to install groundwater wells. Groundwater pumping, if it exceeds the natural recharge rates, may result in decreased groundwater levels relative to existing conditions. Groundwater level reductions may adversely affect offsite groundwater users through reduced groundwater yield from a well, or the need to deepen a well, or the need to construct deeper replacement wells. Additionally, in arid regions and deserts, surface streams, springs, and wetlands may be hydrologically connected to the groundwater. Consequently, the potential seasonal or long-term reductions in groundwater levels may adversely affect flows in seasonal surface water bodies. In addition, discharges of contaminants in stormwater runoff from industrial cooling water could affect surface water quality. However, absent site-specific project operations and groundwater information, it is not possible to characterize the probability of solar thermal facility operations to cause adverse offsite groundwater effects.

(b) Solar Photovoltaic

Long-term facility operations of solar photovoltaic systems could likely include water use for periodic washing of solar panels, site dust control, and domestic water consumption by the work force. In areas where surface water resources are limited, development of groundwater wells to support groundwater pumping, if it exceeds the natural recharge rates, may result in decreased groundwater levels relative to existing conditions. Groundwater level reductions may adversely affect offsite groundwater users through reduced groundwater yield from a well, or the need to deepen a well, or the need to construct deeper replacement wells. Additionally, in arid regions and deserts, surface streams, springs, and wetlands may be hydrologically connected to the groundwater. Consequently, the potential seasonal or long-term reductions in groundwater levels may adversely affect flows in seasonal surface water bodies. In addition, discharges of contaminants in stormwater runoff from industrial cooling water could affect surface water quality. However, absent site-specific project operations and groundwater

information, it is not possible to characterize the probability of solar photovoltaic facility operations to cause adverse offsite groundwater effects.

(c) Geothermal

Geothermal energy facilities may use geothermal fluids directly for turbine power generation, which may result in consumptive use through evaporation or discharge to brine ponds if the quality is unsuitable for reinjection back into the aquifer. Geothermal fluids also may be used indirectly as the heat source to generate steam power using supplemental water resources for steam generation, evaporative cooling, or both processes. In arid desert regions where available surface water is limited, the construction and operation of geothermal facilities may result in the need to use groundwater. Consequently, geothermal energy facility operations in areas of limited groundwater availability can potentially adversely affect offsite groundwater resources for other energy sources. In addition, discharges of contaminants in stormwater runoff from industrial cooling water could affect surface water quality. However, absent site-specific project operations and groundwater information, it is not possible to characterize the probability of geothermal facility operations to cause adverse offsite groundwater effects.

(d) Biogas and Solid-fuel Biomass

Solid-fuel biomass energy facilities are likely to be operated to generate steam power using supplemental water resources for steam production and evaporative cooling. In the arid desert regions where available surface water is limited, the construction and operation of biogas may result in the need to use groundwater. Energy facility operations in areas of limited groundwater availability can potentially adversely affect offsite groundwater resources. However, absent site-specific project operations and groundwater information, it is not possible to characterize the probability of solid-fuel biomass or biogas facility operations to cause adverse offsite groundwater effects.

The potential for construction and placement of energy facilities on the landscape to contribute to offsite flooding, or be exposed to flooding and flood hazards are related to drainage conditions. Increased stormwater drainage runoff rates and volumes may contribute to increased offsite channel flows that lead to additional inundation in existing areas of flooding, or increase the frequency with which channel capacities are exceeded. In the rural desert regions of the southwest, many areas that flood are not mapped and overland flooding can occur on the relatively level terrain, particularly in areas where the soil or bedrock is naturally impervious and generates high volumes of runoff during heavy rain events. Therefore, placement of energy facilities may expose property and workers at risk of exposure to flooding unless the site has been evaluated to determine the potential for flooding to occur. Moreover, encroachment of energy facilities within a floodplain could impede, restrict, or redirect flows, thereby exposing the facilities to flood damage or contribute to backwater upstream of the facility. Absent site-specific project drainage and streamflow information, it is not possible to characterize the probability of facility operations to cause adverse offsite effects to stormwater drainage or flooding risks. Therefore, the specific effects of additional

drainage that could occur in the project area, or risks to and from flooding hazards, are uncertain.

Steam power generation facilities have the potential to result in long-term operational waste discharges associated with the steam condensation and cooling operations. In arid environments of southern California where many of the anticipated future renewable energy facilities might be located, and where available surface and groundwater resources are limited, cooling operations that use water generally result in the creation of highly saline blowdown water or brine. Brine wastes must be stored in lined containment ponds to prevent leakage and contamination of underlying groundwater. Typical operations would require multiple brine waste evaporation ponds, and dried brine wastes would be periodically collected and hauled to landfills for disposal. Therefore, managed brine waste storage in the arid desert regions is not anticipated to result in discharges of concern to water bodies. While unlikely to occur in the desert regions due to limited water availability, the potential exists for some renewable energy facilities to be constructed adjacent to streams and involve the use of river water for cooling operations, or as receiving water for cooling water derived from a different source water. Conventional once-through cooling also may be more commonly used in less arid environments or coastal settings where a reliable and plentiful water source is available. Cooling water discharged to streams has the potential to cause temperature increases in the receiving water of sufficient magnitude that may exceed the thermal tolerance of aquatic life residing in the stream near the return flow, thus resulting in detrimental effects.

Steam power generation facilities generally are complex facilities that would have larger workforce requirements than other types of renewable energy facilities, may operate continuously depending on the fuel source, and may use and store a variety of operating chemicals, fuels, and other materials onsite. Industrial sites may be exposed to long-term rainfall and runoff that may have the potential to mobilize and transport contaminants that are present offsite to adjacent properties or receiving water bodies. Discharge of contaminants could result in adverse water quality effects to aquatic organisms, which are likely to be the most sensitive beneficial uses affected by stormwater runoff.

Absent site-specific project facility information, it is not possible to characterize the probability of steam power cooling operations and industrial activities to cause adverse offsite effects and contaminant discharges to receiving water bodies. Therefore, the specific effects of long-term facility operations that could occur are uncertain and impacts could be significant.

Impact Significance Determination

For the reasons discussed above, operational impacts on hydrology and water quality could be potentially significant due to implementation of the reasonably foreseeable compliance responses associated with Cap-and-Trade offset protocols, changes in land uses associated with new fuels regulations under LCFS measures, and new renewable

energy projects under renewable energy and energy efficiency, including SB 350 and LCFS.

Mitigation Measures

This impact could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of the CARB and not within its purview.

Mitigation Measure 10.b.i

As described above, impacts related to mine methane offset protocol projects would be reduced to a less-than-significant level through implementation of existing regulations, including SMCRA, the Clean Water Act, and the Soil and Water Resources Conservation Act. The U.S. federal government and CARB lack the authority to propose or implement these, or similar laws within Canada. Thus, the authority to determine project-level impacts and applicable regulations lies with the permitting agency for individual projects in Canada. Further, the programmatic analysis does not allow project-specific details of mitigation, resulting in an inherent uncertainty in the degree of mitigation ultimately implemented to reduce the potentially significant impacts. As a result, no mitigation is available to reduce potentially significant impacts related to mine methane capture projects in Canada.

Mitigation Measure 10.b.ii

The Regulatory Setting in Attachment A includes applicable laws and regulations that provide protection of hydrology and water quality. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local or State land use approval and/or permitting authority. New or modified facilities in California would qualify as a “project” under CEQA. The jurisdiction with primary approval authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices that are routinely required to avoid and/or minimize impacts to hydrology and water quality include:

- Use no-till agriculture to reduce soil erosion.
- Avoid harvesting in areas with steep slopes.
- Identify and avoid areas with unstable slopes and local factors that can cause slope instability (groundwater conditions, precipitation, seismic activity, slope angles, and geologic structure).
- Identify soil properties, engineering constraints, and facility design criteria.

- Develop a site grading and management plan to identify areas of disturbance, areas of cut and fill, slope during and after grading, existing vegetation, and measures to protect slope, drainages, and existing vegetation in the project area.

- Develop an erosion control plan to delineate measures to minimize soil loss and reduce sedimentation to protect water quality.

- Design runoff control features to minimize soil erosion.

- Construct drainage ditches only where necessary.

- Use appropriate structures at culvert outlets to prevent erosion.

Mitigation Measure 10.b.iii

The Regulatory Setting in Attachment A includes applicable laws and regulations that provide protection of hydrology and water quality. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local or State land use approval and/or permitting authority. New or modified facilities in California would qualify as a "project" under CEQA. The jurisdiction with primary approval authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices that are routinely required to avoid and/or minimize impacts to hydrology and water quality:

- As part of the subsequent project-level planning and environmental review for solar thermal, solar photovoltaic, geothermal, and biogas facilities, the project proponent shall coordinate with the local county groundwater management authority and prepare a detailed hydrogeologic analysis of the potential project-related effects on groundwater resources prior to issuance of any permits. The proponent shall mitigate for identified adverse changes to groundwater by incorporating technically achievable and feasible modifications into the project to avoid offsite groundwater level reductions, use alternative technologies or changes to water supply operations, or otherwise compensate or offset the groundwater reductions that occur to offsite properties. Consistent with state policies, the feasibility of using alternative water sources, such as treated municipal wastewater, shall be considered for use as source water for non-consumption purposes. The feasibility of alternative energy unit cooling methods should be considered that use less water, such as dry cooling methods. A program of monitoring and adaptive management during project implementation should be considered to evaluate the effects of the project and effectiveness of mitigation actions.

- For any planned use of water, identify the water sources, legal entitlements, water rights, adequacy of capacity to serve project demands while maintaining aquatic and riparian resources, quantity of water used for project construction and operational needs, and water discharges, including but not limited to construction, systems testing, and process and cooling needs.

- Where a groundwater well is proposed to be drilled or used, submit an application to the appropriate local jurisdiction for a permit. Where use of surface water is proposed for industrial purposes, provide a "will serve" and an approved water service agreement with applications to appropriate lead agencies.

- Under the oversight of the local lead agency, prior to issuance of any construction permits, the proponents for the proposed renewable energy project shall prepare a stormwater drainage and flood control analysis and management plan. The plans shall be prepared by a qualified professional and shall summarize existing conditions and the effects of project improvements, shall include all appropriate calculations, a watershed map, changes in downstream flows and flood elevations, proposed on- and off-site improvements, features to protection downstream uses, and property and drainage easements to accommodate downstream flows from the site. Project drainage features shall be designed to ensure no change in existing downstream flow conditions that would result in new or increased severity of offsite flooding.

- Establish drainage performance criteria for off-site drainage, in consultation with county engineering staff, such that project-related drainage is consistent with applicable facility designs, discharge rates, erosion protection, and routing to drainage channels, which could be accomplished by, but is not limited to: (a) minimizing directly connected impervious areas; (b) maximizing permeability of the site; and, (c) stormwater quality controls such as infiltration, detention/retention, and/or biofilters; and basins, swales, and pipes in the system design.

- The project proponent shall design and construct new facilities to provide appropriate flood protection such that operations are not adversely affected by flooding and inundation. These designs shall be approved by the local land use agency. The project proponent shall also consult with the appropriate flood control authority on the design of offsite stream crossings such that the minimum elevations are above the predicted surface-water elevation at the agency's designated design peak flows. Drainage and flood prevention features shall be inspected and maintained on a routine schedule specified in the facility plans, and as specified by the county authority.

- Under the oversight of the local lead agency, prior to issuance of any construction permits, the proponents for the proposed renewable energy project shall comply with applicable construction grading and erosion control ordinances. Additionally, in compliance with the requirements of the SWRCB general NPDES stormwater permit for construction (Order No. 2009-0009-DWQ), the project proponent shall prepare a SWPPP and identify and implement construction-related BMPs to avoid and minimize erosion and contaminant runoff. The SWPPP describes the site, erosion and sediment controls, means of waste disposal, control of post- construction sediment and erosion control measures and maintenance responsibilities, water quality monitoring and reporting during storm events, corrective actions for identified water quality problems and non- storm water management controls. These measures included in the SWPPP shall ensure compliance with applicable regional, state and federal water quality standards. The project proponent shall obtain authorization under the statewide NPDES stormwater permit for general construction activity (or via local agency if construction activity is managed locally) before beginning work. Construction BMPs shall include, but may not be limited to the following:

    - limit construction access routes and stabilize access points;
    - stabilize denuded areas with seeding, mulching or other methods;
    - stake/mark construction limits;
    - designate specific areas of the site, away from storm drain inlets and drainage features for the storage, preparation and disposal of construction materials, chemical products and waste; for auto equipment parking; and for routine vehicle and equipment maintenance;
    - store stockpiled materials and wastes under a roof or plastic sheeting; berm around stockpile/storage areas to prevent contact with runoff;
    - perform major maintenance, repair and vehicle and equipment washing offsite or in designated and controlled areas on-site;
    - sweep up spilled dry construction materials (cement, fertilizer, etc.) immediately; water would not be used to wash them away; and
    - clean up liquid spills on paved or impermeable surfaces using “dry” clean-up methods (e.g. absorbent materials, cat litter, rags) and dispose of clean-up materials properly.

Post-Mitigation Significance Determination

Because the authority to determine project-level impacts and require project-level mitigation lies with the land use approval and/or permitting agency for individual projects, and that the programmatic analysis does not allow project-specific details of mitigation, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts on hydrology and water quality.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this Final~~Draft~~ EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that operational impacts to hydrology and water quality associated under the ~~Proposed~~Scoping Plan would be **potentially significant and unavoidable**.

11. Land Use and Planning

a) Impact 11.a: Construction-Related Impacts to Land Use and Planning

As summarized in Chapter 2, section D.1, the reasonably foreseeable compliance responses associated with the ~~Proposed~~Scoping Plan would require construction activities. These impacts address the building phase of both reasonably foreseeable construction of new facilities or modification of existing facilities that involve earth-moving activities.

With respect to effects related to land use and planning, the conversion of lands required to implement the reasonably foreseeable compliance responses associated with the ~~Proposed~~Scoping Plan could be in areas subject to local conservation plans or zoning policies. This could then result in an intensification of adverse effects associated with the conversion or modification of natural land or existing agriculture such as impacts on sensitive species populations; soil carbon content; annual carbon sequestration losses, depending on the land use; long-term erosion effects; adverse effects on local or regional water resources; and long-term water quality deterioration associated with intensified fertilizer use, pesticide or herbicide run-off. However, planning efforts associated with the implementation of compliance responses associated with the ~~Proposed~~Scoping Plan would be made in coordination with local, State, or federal jurisdictions. Thus, reasonably foreseeable compliance responses would not be expected to divide an established community or conflict with a land use or conservation plan.

Impact Significance Determination

Therefore, construction-related land use impacts associated with implementation of the ~~Proposed~~Scoping Plan would be **less-than-significant**.

The environmental consequences of land use changes are considered in their respective sections of the Final~~Draft~~ EA. Potential indirect environmental impacts associated with land use change on agriculture and forestry, biology, geology and soils, and hydrology and their related mitigation measures are discussed in further detail throughout this chapter.

Mitigation Measures

No mitigation is necessary.

b) Impact 11.b: Operational Impacts to Land Use and Planning

As summarized in Chapter 2, section D.2, the reasonably foreseeable compliance responses associated with the ~~Proposed~~Scoping Plan would require long-term operational changes. These operational changes are related to implementation of new fuels regulations under LCFS measures, new renewable energy projects associated with renewable energy and energy efficiency, including SB 350 measures and LCFS, and offset protocols associated with the Cap-and-Trade Program.

i. LCFS Measures

Implementation of the ~~Proposed~~Scoping Plan could result in more stringent requirements under LCFS that would decrease the overall average CI level of California's fuel pool. These new fuels regulations could result in compliance responses requiring the long-term operation of feedstock or fuel production, processing or distribution facilities, extended cultivation of biofuel crops, changes in agricultural land uses from one crop to another crop, and expansion of agricultural land onto neighboring undeveloped lands such as natural grasslands or forests.

The LCFS regulation is designed to incent fuel pathways with lower CI values, which already account for land use change related GHG emissions. However, non-GHG impacts such as decreased biodiversity and impacts on water resources are not accounted for in the CI value of fuels, even as the metric incorporates carbon losses from deforested and other converted lands. Carbon storage of existing land uses does not sufficiently measure an area's level of biodiversity or sensitivity to land disturbance. Removal of natural undeveloped lands could lead to irreversible non-GHG impacts, such as loss of species populations, or impacts with a payback ("grow back") period of up to a few hundred years (Lapola et al. 2010). Due to the market-driven nature of the future biofuel mix, an increased demand for low-CI fuels could possibly incur higher non-GHG land use change impacts than a higher-CI fuel, especially if the low CI fuel feedstocks are sourced from an area with a sensitive ecosystem or geology. However, compliance responses, such as increased use of cellulosic ethanol, would generally use materials from fuel reduction practices, thus not requiring a substantial change in land use associated with feedstock production. Impacts associated with land use and planning are wide-reaching, affecting nearly all resource impact areas, especially when considering indirect land use changes.

With respect to effects related to only land use and planning, the long-term conversion of lands required to meet the upstream demands for fuels to meet the proposed fuels regulations could also conflict with local conservation plans or zoning policies. The increased demand could result in continued occurrences of direct land use change due to the expansion of agricultural lands and continued occurrences of indirect expansion of displaced agricultural lands. This could then result in an intensification of adverse effects associated with the conversion or modification of natural land or existing agriculture such as impacts on sensitive species populations; soil carbon content; annual carbon sequestration losses, depending on the land use; long-term erosion effects; adverse effects on local or regional water resources; and long-term water quality deterioration associated with intensified fertilizer use, pesticide or herbicide run-off. The environmental consequences of land use changes are considered in their respective sections of the Final~~Draft~~ EA.

ii. Renewable Energy and Energy Efficiency, Including SB 350 and LCFS Measures

Implementation of renewable energy and energy efficiency, including SB 350 measures and increased stringency of LCFS would increase the number of renewable energy projects.

(a) Division of Established Communities

Renewable energy projects would include installation of transmission lines, which could traverse both incorporated and unincorporated jurisdictions. In general, transmission lines (both above ground and underground) would not physically divide existing communities because the transmission lines could co-exist with existing uses. Future proposed land uses would be required to follow set-back requirements to avoid potential conflicts with transmission lines. Although temporary and permanent disruptions to land uses could result to make way for transmission rights-of-ways, routing of transmission lines often involves substantial public, agency, and other stakeholder involvement. As such, any disruptions are expected to be isolated and would not likely permanently divide an existing community.

Wind farms, solar thermal, and solar photovoltaic systems are generally located in large open space areas, including farmland, and involve dispersed placement of equipment away from existing communities. Geothermal leasing and development requires a relatively small footprint and the land required is not usually completely occupied by the plant. Therefore, these projects would not be expected to physically divide an existing community.

To be economically feasible, dedicated biomass plants are located either at the source of a fuel supply (such as at a sawmill) or within 50 miles of numerous suppliers (up to 200 miles for a very high quantity, lost cost supplier). Biomass plants have a relatively small footprint and would generally be compatible with nearby uses (i.e., near the fuel supply or suppliers) and; therefore, development of biomass plants is not expected to physically divide existing communities.

Similarly, although the production of biomass fuel supply requires large amounts of land, fuel production is anticipated to occur in areas already supplying or suitable for supplying certain fuel types. For instance, wood and wood waste are the primary biomass resources and are typically concentrated in areas of high forest-product industry activity. In rural areas, agricultural production can often yield substantial fuel resources that can be collected and burned in biomass plants. Energy crops, such as switchgrass and short rotation woody crops, have also been identified as potential biomass sources. In urban areas, biomass is typically composed of wood wastes such as construction debris, pallets, yard and tree trimmings, and railroad ties. Because biomass fuel production would likely occur in locations consistent with its production, the production of biomass fuel is not anticipated to physically divide an existing community.

Distributed biogas projects could be constructed throughout the state, but are likely to be in proximity to agricultural areas because of access to fuel and because of potential odor generation. Because landfill/digester gas projects would rely on existing waste for fuel, additional land would not be required to generate fuel. For these reasons, an increase in biogas projects is not expected to physically divide an existing community.

Because small hydroelectric power generation projects would be located at rivers and dams, increased small hydroelectric power generation is not anticipated to physically divide an existing community.

(b) Aviation Considerations

A general air navigation concern is associated with tall structures. Therefore, there could be wind power siting concerns relative to the locations of airports and flight patterns and air space associated with the airports because of the turbines and meteorological towers located at wind energy projects. The Federal Aviation Administration (FAA) must be contacted for any proposed construction or alteration of objects within navigable airspace under any of the following categories:

- proposed objects more than 200 ft above ground level at the structure's proposed location;
- within 20,000 ft of an airport or seaplane base that has at least one runway longer than 3,200 ft, and the proposed object would exceed a slope of 100:1 horizontally from the closest point of the nearest runway;
- within 10,000 ft of an airport or seaplane base that does not have a runway more than 3,200 ft in length, and the proposed object would exceed a 50:1 horizontal slope from the closest point of the nearest runway; and/or
- within 5,000 ft of a heliport and the proposed object would exceed a 25:1 horizontal slope from the nearest landing and takeoff area of that heliport (FAA 2007, Proposed Construction or Alteration of Objects That

May Affect the Navigable Airspace, Advisory Circular 70/7470-2K, U.S. Department of Transportation, effective March 1.).

The FAA could recommend marking and/or lighting a structure that does not exceed 200 feet above ground level, or that is not within the distances from airports or heliports mentioned above, because of its location (FAA 2007). Because a wind energy development project would have to meet appropriate FAA criteria, no adverse impacts to aviation would be expected.

Thus, renewable energy supply projects would not divide established communities or conflict with airport planning**.**

iii. Cap-and-Trade Measure

Under the post-2020 Cap-and-Trade Offset Protocols, eligible offset credits would be generated through projects that are in conformance with all applicable environmental, health, and safety regulations. Implementation of the ODS Offset Protocol would involve the use of existing facilities, and would not involve changes to land use and planning. Implementation of the Livestock Offset Protocol would allow the operation of digesters in agricultural settings. Digesters are an allowed use in agricultural areas; therefore, their operation would not conflict with existing land use plans. Projects implemented under the Urban Forest Offset Protocol and Rice Cultivation Protocol would not conflict with land use plans because existing land uses would remain the same as the existing conditions (CARB 2010, CARB 2014a).

Implementation of the MMC Protocol could result in the installation of mine methane gas extraction, capture, transportation, treatment, destruction, and monitoring equipment would be situated at either active or abandoned mines throughout the United States. Mine methane management can be considered an integral part of mine operations and therefore would not result in land use conflicts at active mines. In some circumstances, MMC offset projects located at abandoned mines could be located within or adjacent to areas where reclamation has occurred after a mine's closure and abandonment. Mine reclamation activities such as re-vegetation, reforestation, and geomorphological restoration on abandoned mine lands can also eventually lead to restored public use. Any MMC compliance response activities at abandoned mining sites would be required to comply with federal, state and local permitting requirements under SMCRA or applicable land use and zoning regulations that are in effect after completion of reclamation activities, to avoid potential land use conflicts on abandoned mining lands.

The reasonably foreseeable compliance responses and impacts associated with implementation of offset protocols in Canada would be similar to those described above for mine methane capture and ODS projects. As discussed, there would not be significant impacts related to ODS projects. Implementation of landfill projects in Ontario would involve installation of gas collection and control systems, which would require minor modifications to existing waste facilities, thus not affecting existing land uses within a project site. However, the noted regulations that would reduce the severity of impacts associated with mine methane capture projects, described above, do not apply

to areas within Canada, and have authority only in areas within the United States and/or California. While Canadian federal, provincial, and municipal environmental laws contain some requirements like those associated with SMCRA, it is unknown where and under which jurisdiction individual projects may be located. Thus, the authority to determine project-level impacts and applicable regulations lies with the permitting agency for individual projects. Further, the programmatic analysis does not allow project-specific details of mitigation, resulting in an inherent uncertainty in the degree of mitigation that would ultimately be implemented to reduce the potentially significant impacts. Thus, land use and planning impacts could be significant, related to implementation of mine methane capture offset projects in Canada.

Under the Forest Offset Protocol, avoided conversion projects involve preventing the conversion of forestland to a non-forest land use by dedicating the land to continuous forest cover through a conservation easement or transfer to public ownership where forests are at risk of conversion. Specifically, to qualify as an avoided conversion project, the private forest owner must demonstrate there is a substantial threat of conversion of the project land to a non-forest use. To demonstrate that the land is likely to be converted to a non-forest use, the private land owner must provide a real estate appraisal showing that potential non-forest land use would generate substantially higher land value than forest use and at least one of the following forms of documentation that the potential conversion would be legally permissible:

1. Documentation indicating that the current land use policies, including zoning and general plan ordinances, and other local and state statutes and regulations, permit the anticipated type of conversion.

2. Documentation indicating that the Forest Owner has obtained all necessary approvals from the governing county to convert the project area to the proposed type of non-forest land use (including, for instance, certificates of compliance, subdivision approvals, timber conversion permits, other rezoning, major or minor use permits)

3. Documentation indicating that similarly situated forestlands within the project's assessment area were recently able to obtain all necessary approvals from the governing county, state, or other governing agency to convert to a non-forest land use (including, for instance, certificates of compliance, subdivision approvals, timber conversion permits, other rezoning, major or minor use permits)

Because avoided conversion projects could occur on land planned for other, non-forest uses and, if so, would prevent the planned non-forest use from occurring, avoided conversion projects could conflict with local land use plans.

Impact Significance Determination

For the reasons discussed above, operational impacts on land use and planning could be potentially significant due to implementation of the reasonably foreseeable compliance responses associated with Cap-and-Trade offset protocols.

Mitigation Measures

This impact could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of the CARB and not within its purview.

Mitigation Measure 11.b.i

The Regulatory Setting in Attachment A includes applicable laws and regulations that address land use and planning. CARB does not have the authority to require implementation of mitigation related to new or modified facilities or infrastructure that would be approved by other State agencies or local jurisdictions. The ability to require such measures is within the purview of jurisdictions with land use approval and/or permitting authority. Project-specific impacts and mitigation would be identified during the project review process and carried out by agencies with approval authority.

Proponents of avoided conversion offset projects under the Forest Offset Protocol will coordinate with local land use agencies to reconcile land use plan and zoning designations and the ongoing undeveloped forest condition of the project area. Local land use agencies will complete appropriate reviews to ensure that the project complies with applicable land use plans and regulations, or where conflicts exist, will implement appropriate land use designation changes so that proposed avoided conversion projects would be compatible with appropriate land use documents and policies. Land use agencies should consider compatible densities and land use types at the edges of the avoided conversion area and the avoided conversion project should conform, to the extent feasible, with applicable land use goals, objectives, and policies.

As described above, impacts related to mine methane offset protocol projects would be reduced to a less-than-significant level through implementation of existing regulations, including SMCRA, the Clean Water Act, and the Soil and Water Resources Conservation Act. The U.S. federal government and CARB lack the authority to propose or implement these, or similar laws within Canada. Thus, the authority to determine project-level impacts and applicable regulations lies with the permitting agency for individual projects in Canada. Further, the programmatic analysis does not allow project-specific details of mitigation, resulting in an inherent uncertainty in the degree of mitigation ultimately implemented to reduce the potentially significant impacts. As a result, no mitigation is available to reduce potentially significant impacts related to mine methane capture projects in Canada.

Post-Mitigation Significance Determination

Because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this Final~~Draft~~ EA does not attempt to address project-specific details of mitigation, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts to land use and planning.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this Final~~Draft~~ EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that operational impacts to land use and planning associated with the Cap-and-Trade Program offset protocols under the ~~Proposed~~Scoping Plan would be **potentially significant and unavoidable**.

12. Mineral Resources

a) Impact 12.a: Construction-Related Impacts to Mineral Resources

As summarized in Chapter 2, section D.1, the reasonably foreseeable compliance responses associated with the ~~Proposed~~Scoping Plan would require construction activities. These impacts address the building phase of both reasonably foreseeable construction of new facilities or modification of existing facilities that involve earth-moving activities.

Implementation of the ~~Proposed~~Scoping Plan could result in the construction of new manufacturing plants and other buildings. These would likely occur within existing footprints or in areas with consistent zoning where original permitting and analyses considered these issues.

Impact Significance Determination

Therefore, construction-related impacts on mineral resources associated with the ~~Proposed~~Scoping Plan would be **less-than-significant**.

Mitigation Measures

No mitigation is necessary.

b) Impact 12.b: Operational Impacts to Mineral Resources

As summarized in Chapter 2, section D.2, the reasonably foreseeable compliance responses associated with the ~~Proposed~~Scoping Plan would require long-term operational changes. These operational changes are related to increases in the demand for lithium-based batteries, and necessary mining activities, associated with the State

SIP Strategy measures and renewable energy and energy efficiency, including SB 350 measures.

The demand for additional mining to meet increased use of batteries could result in the development of new mines and mining of lithium. For the purposes of this document it would be too speculative to determine if, when, and where a new mine may be located. In the case that new mines are required, they would go through independent environmental review at the appropriate federal, state, or local level (see Attachment A for more information). It is assumed, for the purposes of this analysis that any new mines would be in areas with appropriate zoning, and subject to Federal, State, and/or local requirements.

Batteries associated with zero and near-zero vehicles are primarily lithium-based. Generally, other types of HEV, PHEV, and EV battery options, such as nickel-metal hydride are not as favorable due to challenges related to high cost, high self-discharge, and heat generation at high temperatures (U.S. Department of Energy [DOE] 2016). Thus, it is assumed that mineral resource requirements associated with implementation of recommended measures in the ~~Proposed~~Scoping Plan would be related to lithium resources.

As of January 2015, the only lithium mine operating in the U.S. was a brine operation in Nevada. Two companies produced a large array of downstream lithium compounds in the U.S. from domestic or South American lithium carbonate, lithium chloride, and lithium hydroxide. Lithium consumption for batteries has increased substantially in recent years due to increased demand for rechargeable lithium batteries. Currently the U.S. imports most lithium from Chile (50 percent), Argentina (46 percent); and China (3 percent). Worldwide mine production and reserves are provided in Table 4-1 (U.S. Geological Survey [USGS] 2015).

Table 4-1
Mine Production and Reserves

Country	2013 (metric tons)	2014 (metric tons)	Reserves (metric tons)
U.S.	870	N/A	38,000
Argentina	2,500	2,900	850,000
Australia	12,700	13,000	1,500,000
Brazil	400	400	48,000
Chile	11,200	12,900	7,500,000
China	4,700	5,000	3,500,000
Portugal	570	570	60,000
Zimbabwe	1,000	1,000	23,000
World total (rounded)	34,000	36,000	13,500,000
Note: Reserves data are dynamic. They may be considered a working inventory of mining companies' supply of an economically extractable mineral commodity.			

Table 4-1
Mine Production and Reserves

Country	2013 (metric tons)	2014 (metric tons)	Reserves (metric tons)
Inventory is limited by many considerations, including cost of drilling, taxes, price of the mineral commodity being mined, and the demand for it. Source: USGS 2015			

The magnitude of reserves, shown above, is necessarily limited by many considerations, including cost of drilling, taxes, price of the mineral commodity being mined and the associated demand. In addition to the reserves described above, deposits of mineral resources are also important to consider in assessing future supplies. For instance, lithium resources in the U.S. are estimated to total 5.5 million metric tons. In addition, approximately 34 million tons of lithium are estimated to be present in other countries, including 7.5 million metric tons in Bolivia, 9 million metric tons in Chile, 6.5 million metric tons in Argentina, 1.7 million metric tons in Australia, and 6.5 million metric tons in China. In addition, Canada, Congo (Kinshasa), Russia, and Serbia have resources of approximately 1 million metric tons each. (USGS 2015). However, lithium resources around the world are estimated to be approximately 39 million tones (Gruber et al., 2011).

Worldwide demand of global lithium is estimated to be below 20 million metric tons for the period of 2010 through 2100 (Gruber et al., 2011). This is well-below the estimated worldwide lithium resources currently known to exist worldwide. In addition, lithium battery recycling potential could supplement future increased demands (NREL 2011).

Appendix G of the CEQA Guidelines considers an impact on mineral resources to be the loss of availability of a known mineral resource that would be of value to a local entity, a region, or the state. This type of impact could result from actions such as building a structure over an area that contains mineral resources, thereby prohibiting access to mining activities. While implementation of the ~~Proposed~~Scoping Plan and associated compliance responses could result in an increased mining for lithium, it would not significantly affect the availability of a mineral resource.

Impact Significance Determination

Thus, implementation of the ~~Proposed~~Scoping Plan would have a **less-than-significant** operational impact on mineral resources.

Mitigation Measures

No mitigation is necessary.

13. Noise

a) Impact 13.a: Construction-Related Impacts to Noise

As summarized in Chapter 2, section D.1, the reasonably foreseeable compliance responses associated with the ~~Proposed~~Scoping Plan would require construction activities. These impacts address the building phase of both reasonably foreseeable construction of new facilities or modification of existing facilities that involve earth-moving activities.

Construction noise levels that could result from the implementation of new manufacturing facilities, zero and near-zero emissions-related infrastructure, and feedstock processing facilities would fluctuate depending on the type, number, size, and duration of usage for the varying equipment. The effects of construction noise largely depend on the type of construction activities occurring on any given day, noise levels generated by those activities, distances to noise sensitive receptors, and the existing ambient noise environment in the receptor's vicinity. Construction generally occurs in several discrete stages, each phase requiring a specific complement of equipment with varying equipment type, quantity, and intensity. These variations in the operational characteristics of the equipment change the effect they have on the noise environment of the project site and in the surrounding community for the duration of the construction process.

To assess noise levels associated with the various equipment types and operations, construction equipment can be considered to operate in two modes: mobile and stationary. Mobile equipment sources move around a construction site performing tasks in a recurring manner (e.g., loaders, graders, dozers). Stationary equipment operates in a given location for an extended period of time to perform continuous or periodic operations. Operational characteristics of heavy construction equipment are additionally typified by short periods of full-power operation followed by extended periods of operation at lower power, idling, or powered-off conditions.

Additionally, when construction-related noise levels are being evaluated, activities that occur during the more noise-sensitive evening and nighttime hours are of increased concern. Because exterior ambient noise levels typically decrease during the late evening and nighttime hours as traffic volumes and commercial activities decrease, construction activities performed during these more noise-sensitive periods of the day can result in increased annoyance and potential sleep disruption for occupants of nearby residential uses.

The site preparation phase typically generates the most substantial noise levels because of the on-site equipment associated with grading, compacting, and excavation, which uses the noisiest types of construction equipment. Site preparation equipment and activities include backhoes, bulldozers, loaders, and excavation equipment (e.g., graders and scrapers). Construction of large structural elements and mechanical systems could require the use of a crane for placement and assembly tasks, which may also generate noise levels. Although a detailed construction equipment list is not

currently available, based on this project type it is expected that the primary sources of noise would include backhoes, bulldozers, and excavators. Noise emission levels from typical types of construction equipment can range from approximately 74 to 94 A-weighted decibels (dBA) at 50 feet.

Based on this information and accounting for typical usage factors of individual pieces of equipment and activity types, on-site construction could result in hourly average noise levels of 87 dBA equivalent level measurements (L_{eq}) at 50 feet and maximum noise levels of 90 dBA maximum sound level (L_{max}) at 50 feet from the simultaneous operation of heavy-duty equipment and blasting activities, if deemed necessary. Based on these and general attenuation rates, exterior noise levels at noise-sensitive receptors located within thousands of feet from project sites could exceed typical standards (e.g., 50/60 dBA L_{eq}/L_{max} during the daytime hours and 40/50 dBA L_{eq}/L_{max} during the nighttime hours).

Additionally, construction activities may result in varying degrees of temporary groundborne noise and vibration, depending on the specific construction equipment used and activities involved. Groundborne noise and vibration levels caused by various types of construction equipment and activities (e.g., bulldozers, blasting) range from 58 – 109 vibration decibels (VdB) and from 0.003 – 0.089 inch per second (in/sec) peak particle velocity (PPV) at 25 feet. Similar to the above discussion, although a detailed construction equipment list is not currently available, based on this project type it is expected that the primary sources of groundborne vibration and noise would include bulldozers and trucks. Per the Federal Transit Administration (FTA), levels associated with the use of a large bulldozer and trucks are 0.089 and 0.076 in/sec PPV (87 and 86 VdB) at 25 feet, respectively. With respect to the prevention of structural damage, construction-related activities would not exceed recommended levels (e.g., 0.2 in/sec PPV). However, based on FTA's recommended procedure for applying a propagation adjustment to these reference levels, bulldozing and truck activities could exceed recommended levels with respect to the prevention of human disturbance (e.g., 80 VdB) within 275 feet.

Thus, implementation of reasonably foreseeable compliance responses could result in the generation of short-term construction noise more than applicable standards or that result in a substantial increase in ambient levels at nearby sensitive receptors, and exposure to excessive vibration levels.

Impact Significance Determination

For the reasons described above, construction-related impacts on noise associated with implementation of the ~~Proposed~~Scoping Plan could be potentially significant.

Mitigation Measures

Potential noise impacts could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

Mitigation Measure 13.a

The Regulatory Setting in Attachment A includes, but is not limited to, applicable laws and regulations that pertain to noise. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that could be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local or State land use approval and/or permitting authority. New or modified facilities in California would qualify as a "project" under CEQA. The jurisdiction with primary approval authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices that are routinely required to avoid and/or minimize noise include:

- Proponents of new or modified facilities, or infrastructure constructed because of reasonably foreseeable compliance responses, would coordinate with State or local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local or State land use agency or governing body must follow all applicable environmental regulations as part of approval of a project for development.

- Based on the results of the environmental review, proponents would implement all feasible mitigation to reduce or substantially lessen the potentially significant impacts of the project. Actions required to mitigate potentially significant noise impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency.

- Ensure noise-generating construction activities (including truck deliveries, pile driving, and blasting) are limited to the least noise-sensitive times of day (e.g., weekdays during the daytime hours) for projects near sensitive receptors.

- Consider use of noise barriers, such as berms, to limit ambient noise at property lines, especially where sensitive receptors may be present.

- Ensure all project equipment has sound-control devices no less effective than those provided on the original equipment.

- All construction equipment used would be adequately muffled and maintained.

- Consider use of battery-powered forklifts and other facility vehicles.
- Ensure all stationary construction equipment (i.e., compressors and generators) is located as far as practicable from nearby sensitive receptors or shielded.
- Properly maintain mufflers, brakes, and all loose items on construction and operation related vehicles to minimize noise and address operational safety issues. Keep truck operations to the quietest operating speeds. Advise about downshifting and vehicle operations in sensitive communities to keep truck noise to a minimum.
- Use noise controls on standard construction equipment; shield impact tools.
- Consider use of flashing lights instead of audible back-up alarms on mobile equipment.
- Install mufflers on air coolers and exhaust stacks of all diesel and gas-driven engines.
- Equip all emergency pressure relief valves and steam blow-down lines with silencers to limit noise levels.
- Contain facilities within buildings or other types of effective noise enclosures.
- Employ engineering controls, including sound-insulated equipment and control rooms, to reduce the average noise level in normal work areas.

Post-Mitigation Significance Determination

Because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this Final~~Draft~~ EA does not attempt to address project-specific details of mitigation, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant noise impacts.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this Final~~Draft~~ EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that construction-related noise impacts associated with the ~~Proposed~~Scoping Plan would be **potentially significant and unavoidable**.

b) Impact 13.b: Operational Impacts to Noise

As summarized in Chapter 2, section D.2, the reasonably foreseeable compliance responses associated with the ~~Proposed~~Scoping Plan would require long-term

operational changes. These operational changes are related to implementation of land use changes and new facilities related to increased stringency of the LCFS regulation, methane reduction measures associated with the SLCP Strategy, the offset protocols under the Cap-and-Trade Program, increased mining to meet lithium-based battery demands associated with renewable energy and energy efficiency, including SB 350 measures and the State SIP Strategy measures, and new renewable energy projects associated with renewable energy and energy efficiency, including SB 350 measures and LCFS.

i. LCFS Measures

Implementation of the ~~Proposed~~Scoping Plan could result in more stringent requirements under LCFS that would decrease the overall average CI level of California's fuel. These fuels regulations could result in changes to land use to collect or cultivate biofuel feedstock. In general, these activities exist under current conditions. For example, any new farmland used for feedstock cultivation is likely to be adjacent to similar uses; and forests are subject to periodic forest management activities such as thinning, hazardous fuel removal, replanting, and timber harvest. These activities would generate noise on an inconsistent and infrequent basis, related to the availability of cellulosic materials or the harvest season, and would not be considered significant.

New sources of noise associated with implementation of new fuels regulations could include operation of new facilities, such as ethanol processing plants, and installation of new equipment associated with modification to dairies, landfills, and wastewater treatment plants. However, development projects would likely occur within footprints of existing facilities, areas with zoning that would permit the development of manufacturing or industrial uses, or public lands where the appropriate State or federal agency has determined that such uses are allowable. Thus, implementation of any new regulations would not be anticipated to result in modifications near existing public (or public use) airports or private airstrips. No significant increases in noises are anticipated.

ii. SLCP Measures

Under the methane reduction measures included in the SLCP Strategy, new sources of noise could include operation of new facilities, such as dairy and wastewater treatment anaerobic digesters; and installation of new equipment associated with modification to dairies, and wastewater treatment and oil and gas facilities. Flares, which can emit high levels of noise, may be used at digesters and oil and gas facilities to dispose of methane vapors. However, flares at digesters would operate only for emergency purposes and would generally not be expected to be used; and, flares installed at oil and gas facilities would be enclosed and meet low-NOx standards. Unlike, outdoor flares, low-NOx flares are enclosed and do not emit substantial levels of noise. Thus, flares installed because of implementation of the ~~Proposed~~Scoping Plan would not substantially affect noise levels. Depending on the proximity to existing noise-sensitive receptors, digester and new equipment noise levels could exceed applicable noise standards and result in a significant increase in ambient noise levels.

iii. Cap-and-Trade Measures

Under the post-2020 Cap-and-Trade Offset Protocols, eligible offset credits would be generated through projects that are in conformance with all applicable environmental, health, and safety regulations. Implementation of the ODS Offset Protocol and Rice Cultivation Protocol would not require earth-moving activities or new equipment that would result in substantial levels of noise in addition to existing conditions on individual project sites (CARB 2010, CARB 2014a). Operational-related activities associated with urban forest offset projects would involve landscape maintenance (e.g., inspection, trimming, and tree care). These activities would be minimal and not anticipated to result in a doubling of average daily traffic (ADT) volumes on affected roadway segments. In addition, these activities would require minimal equipment that would mostly be non-motorized, and would occur in urban areas where existing ambient noise levels are already relatively high and during the less sensitive daytime hours.

Projects implemented under the U.S. Forest Offset Protocol would occur in forested areas. U.S. Forest projects may produce elevated noise levels that exceed accepted ambient levels. However, the U.S. Forest Offset Protocol does not alter the extent of forest activities, but simply shifts some activities to projects that sequester carbon. Because the level of overall forest activities would not change, the consequential noise impacts would not change.

Implementation of the MMC Protocol would involve the installation of methane capture and destruction equipment and some projects may involve the installation of gas processing equipment and/or gathering lines and operation of new stationary noise sources (e.g., compressors, flares, oxidizers); however, it is not expected that MMC projects would be within close enough proximity of a noise-sensitive receptor to be deemed a significant noise increase (CARB 2013).

The reasonably foreseeable compliance responses and impacts associated with implementation of offset protocols in Canada would be similar to those described above for the mine methane capture and ODS projects. As discussed, there would not be significant impacts related to ODS or mine methane capture projects. Implementation of landfill projects in Ontario would involve installation of gas collection and control systems, which would require minor modifications to existing waste facilities, thus there would not be new noise sources associated with individual projects.

Implementation of the Livestock Offset Protocol would allow the operation of digesters in agricultural settings. Operation of digesters could result in adverse noise impacts on sensitive receptors that could be significant.

iv. Renewable Energy and Energy Efficiency, Including SB 350 and State SIP Strategy Measures

Implementation of the ~~Proposed~~Scoping Plan could result in increased mining to meet demands for greater supplies of lithium-based batteries associated with renewable energy and energy efficiency, including SB 350 measures and the State SIP Strategy measures. Implementation of the reasonably foreseeable compliance responses

associated with renewable energy and energy efficiency, including SB 350 measures and State SIP Strategy measures could increase mining of lithium to meet demands for new batteries. Operational-related activities associated with lithium mining could produce substantial stationary sources of noise. Mechanical equipment (e.g., dozers) required to excavate bedrock and vegetation would generate noise that could be considered adverse to sensitive receptors; however, it would be expected that expansion of existing mines would not involve sensitive receptors given that mines typically are in areas zoned for such uses. While it would be anticipated that new lithium mines constructed as a compliance response to the ~~Proposed~~Scoping Plan would be in areas of consistent zoning and therefore not in close proximity to sensitive receptors, the exact locations are not known at this time and could result in significant increases in noise.

v. Renewable Energy and Energy Efficiency, Including SB 350 and LCFS Measures

Implementation of renewable energy and energy efficiency, including SB 350 measures and increased stringency of LCFS would increase the number of renewable energy projects. Implementation of renewable energy supply projects could result in additional vehicle trips on the affected roadway systems from worker commute-, maintenance/operation-, and material delivery-related trips) and, consequently, an increase in traffic source noise. The exact number of daily trips required for project operations or the location of affected roadways segments is not known at this time. However, when the ADT volume is doubled on a roadway segment in comparison to existing conditions, the resultant increase is approximately 3 dB Community Noise Equivalent Level (CNEL)/L_{dn}, which is typically considered substantial as a change of this magnitude is perceivable to the human ear. ADT volumes on roadway segments in the project area vary considerably (e.g., from hundreds to hundreds of thousands) under existing no project conditions. Therefore, project operations could result in a doubling of ADT volumes, especially in rural areas where existing ADT volumes would be lower and considering the increased tire and engine source noise from material delivery-related heavy-duty truck trips, along affected roadway segments. Consequently, based on the information above, exterior noise levels at noise-sensitive receptors located near affected roadways could substantially (e.g., 3 dB CNEL/L_{dn}) increase.

Additionally, implementation of the renewable energy supply projects could introduce new on- site stationary noise sources, including rooftop heating, ventilation, and air conditioning equipment; mechanical equipment (e.g., turbines, engines, pumps, blowers); emergency generators; parking lot activities; loading operations; and other related operational activities. Noise levels associated with these types of sources vary greatly, but would generally range from 70 dBA L_{eq} to 80 dBA L_{max} at 50 feet. Based on these and general attenuation rates, exterior noise levels at noise-sensitive receptors located within hundreds of feet from the location of renewable energy project sites could exceed typical standards (e.g., 50/60 dBA L_{eq}/L_{max} during the daytime hours and 40/50 dBA L_{eq}/L_{max} during the nighttime hours).

Consequently, because the specific noise (and vibration) impacts of alternative energy supply projects cannot be identified with any certainty, operational noise impacts could be significant.

Impact Significance Determination

For the reasons discussed above, there would be substantial operational increases in noise associated with Cap-and-Trade offset protocols, methane reduction measures under the SLCP Strategy, increased lithium mining activities due to increased battery demands associated with SB350 and State SIP Strategy measures, and new renewable energy projects associated with renewable energy and energy efficiency, including SB 350 measures and LCFS. These increases could result in potentially significant noise impacts.

Mitigation Measures

This impact could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of the CARB and not within its purview.

Mitigation Measure 13.b.i

The Regulatory Setting in Attachment A includes, but is not limited to, applicable laws and regulations that pertain to noise. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that could be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local or State land use approval and/or permitting authority. New or modified facilities in California would qualify as a “project” under CEQA. The jurisdiction with primary approval authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices that are routinely required to avoid and/or minimize noise include:

- All powered equipment shall be used and maintained according to manufacturer’s specifications.
- Public notice of activities shall be provided to nearby noise-sensitive receptors of potential noise-generating activities.
- All motorized equipment shall be shut down when not in use. Idling of equipment or trucks shall be limited to 5 minutes.
- All heavy equipment and equipment staging areas shall be located as far as possible from nearby noise-sensitive land uses (e.g., residential land uses, schools, hospitals, places of worship, recreation resources).

- To achieve an interior noise level less than applicable noise standards, the installation of double pane windows and building insulation shall be offered to residences directly affected by significant operational noise levels generated by the noise-generating facility. If accepted by the home owner, the project applicant shall provide the funding necessary to install the appropriate noise-reducing building improvements.

Mitigation Measure 13.b.ii: Implement Mitigation Measure 13.b.i

Mitigation Measure 13.b.iii: Implement Mitigation Measure 13.b.i

Mitigation Measure 13.b.iv: Implement Mitigation Measure 13.b.i

Post-Mitigation Significance Determination

Because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this Final~~Draft~~ EA does not attempt to address project-specific details of mitigation, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this Final~~Draft~~ EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that the potentially significant operational impact to noise associated with renewable energy and energy efficiency, including SB 350 measures, LCFS, State SIP Strategy measures, offset protocols in the Cap-and-Trade Program, and SLCP measures under the ~~Proposed~~Scoping Plan would be **potentially significant and unavoidable**.

14. Population, Employment, and Housing

a) Impact 14.a: Construction-Related Impacts to Population and Housing

As summarized in Chapter 2, section D.1, the reasonably foreseeable compliance responses associated with the ~~Proposed~~Scoping Plan would require construction activities. These impacts address the building phase of both reasonably foreseeable construction of new facilities or modification of existing facilities that involve earth-moving activities.

There is uncertainty as to the exact location or character of any new facilities. Construction activities would be anticipated to require relatively small crews, and demand for these crews would be temporary (e.g., 6 – 12 months per project). Therefore, it would be anticipated that the need for a substantial amount of construction worker migration would not occur and that a sufficient construction employment base would likely be available. Construction activities would not require new additional

housing to accommodate or generate changes in land use and, therefore, would not affect the provisions of population and housing

Impact Significance Determination

Therefore, construction-related impacts on population and housing associated with implementation of the ~~Proposed~~Scoping Plan would be **less-than-significant**.

Mitigation Measures

No mitigation is necessary.

b) Impact 14.b: Operational Impacts to Population, Employment, and Housing

As summarized in Chapter 2, section D.2, the reasonably foreseeable compliance responses associated with the ~~Proposed~~Scoping Plan would require long-term operational changes. These operational changes are related to implementation of renewable energy and energy efficiency, including SB 350 measures, LCFS, State SIP Strategy measures, SLCP, Cap-and-Trade, and SB 375 measures.

Overall, the ~~Proposed~~Scoping Plan would decrease reliance on fossil fuels, while increasing renewable energy supplies, reducing the carbon intensity of fuels, and reducing GHG emissions from various sources (e.g., dairies, fireplaces, transportation, and refineries). As described in Appendix E of the ~~Proposed~~Scoping Plan, while some sectors of the economy could see job growth, particularly in the clean energy sector as a result of implementation of measures in the ~~Proposed~~Scoping Plan, this would not result in substantial increases in employment opportunities or otherwise induce substantial population growth in the State.

Implementation of land use strategies in response to potential increases in the stringency of SB 375 targets could result in increased infill development at higher densities near transit stations, increase mixed-use development, increased affordable housing for a range of household incomes, and other activities designed to reduce VMT. MPOs do not have land use authority and would not directly displace existing housing or people, thereby requiring the construction of replacement housing elsewhere.

The Cap-and-Trade Program, including the proposed compliance offset protocols and associated offset projects would not result in significant adverse impacts to employment, population, or housing. Eligible offset credits must be generated through projects that are in conformance with all applicable environmental, health, and safety regulations. No substantial new jobs, housing, or other factors would contribute to increased population levels under the post-2020 Cap-and-Trade Program or linkage to Ontario (CARB 2010, CARB 2013, CARB 2014a).

Impact Significance Determination

Thus, operational activities related to the ~~Proposed~~Scoping Plan would not directly or indirectly result in new additional housing or substantial population growth in an area. As a result, impacts to population and housing would be **less-than-significant**.

Mitigation Measures

No mitigation is necessary.

15. Public Services

a) Impact 15.a: Construction-Related Impacts to Public Services

As summarized in Chapter 2, section D.1, the reasonably foreseeable compliance responses associated with the ~~Proposed~~Scoping Plan would require construction activities. These impacts address the building phase of both reasonably foreseeable construction of new facilities or modification of existing facilities that involve earth-moving activities.

There is uncertainty as to the exact location or character of any new facilities. However, these would likely occur in areas with zoning that would permit the development of manufacturing or industrial uses. Construction activities would be anticipated to require relatively small crews, and demand for these crews would be temporary (e.g., 6 – 12 months per project). Therefore, it would be anticipated that the need for a substantial amount of construction worker migration would not occur and that a sufficient construction employment base would likely be available. Construction activities would not require a substantial amount of new additional housing to accommodate new populations or generate changes in land use, and therefore, would not be expected to increase population levels such that the provisions of public services would be significantly affected.

Impact Significance Determination

Therefore, construction-related impacts on public services associated with implementation of the ~~Proposed~~Scoping Plan would be **less-than-significant**.

Mitigation Measures

No mitigation is necessary.

b) Impact 15.b: Operational Impacts to Public Services

As summarized in Chapter 2, section D.2, the reasonably foreseeable compliance responses associated with the ~~Proposed~~Scoping Plan would require long-term operational changes. These operational changes are related to implementation of

renewable energy and energy efficiency, including SB 350 measures, LCFS, State SIP Strategy measures SLCP, Cap-and-Trade, and SB 375 measures.

As discussed above under Impact 14.b, the ~~Proposed~~Scoping Plan would not induce substantial population growth. Thus, there would not be an increase demand on fire protection, police protection, schools, or other public services related to the recommended action described in Chapter 2 of this Final~~Draft~~ EA. While implementation of land use strategies under SB 375 would aim to create denser cities, any increased demand on public services would be related to population growth that would be related to various economic factors that are not within the scope of a metropolitan planning organization to approve or propose.

Impact Significance Determination

Thus, operational activities related to the ~~Proposed~~Scoping Plan would not directly or indirectly result in increased demand on public services such that new facilities would need to be constructed. Thus, public services impacts would be **less-than-significant**.

Mitigation Measures

No mitigation is necessary.

16. Recreation

a) Impact 16.a Construction-Related Impacts to Recreation

As summarized in Chapter 2, section D.1, the reasonably foreseeable compliance responses associated with the ~~Proposed~~Scoping Plan would require construction activities. These impacts address the building phase of both reasonably foreseeable construction of new facilities or modification of existing facilities that involve earth-moving activities.

There is uncertainty as to the exact location or character of any new facilities. However, these would likely occur in areas with zoning that would permit the development of manufacturing or industrial uses. Construction activities would be anticipated to require relatively small crews, and demand for these crews would be temporary (e.g., 6 – 12 months per project). Therefore, it would be anticipated that the need for a substantial amount of construction worker migration would not occur and that a sufficient construction employment base would likely be available. Thus, construction activities would not increase population levels such that increased demand would be placed on recreational facilities within communities containing new plants and facilities.

Impact Significance Determination

Therefore, construction-related impacts on recreation associated with the ~~Proposed~~Scoping Plan would be **less-than-significant**.

Mitigation Measures

No mitigation is necessary.

b) Impact 16.b: Operational Impacts to Recreation

As summarized in Chapter 2, section D.2, the reasonably foreseeable compliance responses associated with the ~~Proposed~~Scoping Plan would require long-term operational changes. These operational changes are related to implementation of new renewable energy projects associated with renewable energy and energy efficiency, including SB 350 measures and LCFS, and offset projects under Cap-and-Trade.

i. Renewable Energy and Energy Efficiency, Including SB 350 and LCFS Measures

Implementation of renewable energy and energy efficiency, including SB 350 measures and increased stringency of LCFS would increase the number of renewable energy projects. Renewable energy projects could occupy land that also provides important recreation opportunity, supports recreation uses, or provides access to recreation resources elsewhere. This could affect any type of outdoor recreation known to occur on public and private lands throughout rural California and/or nearby Western States. Recreation uses most likely to be affected are activities that involve large land areas, such as off-highway motorized recreation, non-motorized recreational travel (such as hiking, horseback riding, cycling), or hunting. If these recreation activities were displaced by renewable energy projects, additional use pressure would be transferred to other similar recreation resource lands in the same region of the project. Also, new renewable energy generation and transmission facilities could directly disrupt, indirectly interfere with use of, or reduce the recreational resource qualities of private land occupied by or located near renewable energy projects. While the specific location of projects cannot be identified with any certainty, the magnitude of increased renewable energy is not known, therefore, the specific effects of long-term facility operations that could occur are uncertain and impacts could be significant.

ii. Cap-and-Trade Measure

Under the post-2020 Cap-and-Trade Offset Protocols, eligible offset credits would be generated through projects that are in conformance with all applicable environmental, health, and safety regulations. Implementation of the ODS Offset Protocol, the Livestock Offset Protocol, Rice Cultivation Protocol, and the Urban Forest Offset Protocol, and associated offset projects would not increase population levels or otherwise place increased demand on recreation resources (CARB 2010, CARB 2014a). Forest management activities could disrupt opportunities for forest recreation, but such disruptions exist under current conditions. Offset projects developed under the U.S. Forest Offset Protocol would occur on land that was historically forested or currently forested, and consequently, the overall impact to recreational resources would not be significant (CARB 2010).

Implementation of the MMC Protocol could result in offset project located at abandoned mines which could potentially affect recreational uses on reclaimed mining lands. If

MMC offset projects would be located at abandoned mines where recreation activities are included as permitted uses under an approved mine reclamation plan, any such activities would be required to comply with federal and state permitting requirements under SMCRA through Office of Surface Mining Reclamation and Enforcement or other state agencies with permitting authority. Therefore, any potential impacts related to recreation would not be significant (CARB 2013).

The reasonably foreseeable compliance responses and impacts associated with implementation of offset protocols in Canada would be similar to those described above for mine methane capture and ODS projects. As discussed, there would not be significant impacts related to ODS projects. Implementation of landfill projects in Ontario would involve installation of gas collection and control systems, which would require minor modifications to existing waste facilities, thus not affecting recreation resources. However, the noted regulations that would reduce the severity of impacts associated with mine methane capture projects, described above, do not apply to areas within Canada, and have authority only in areas within the United States and/or California. While Canadian federal, provincial, and municipal environmental laws contain some requirements like those associated with SMCRA, it is unknown where and under which jurisdiction individual projects may be located. Thus, the authority to determine project-level impacts and applicable regulations lies with the permitting agency for individual projects. Further, the programmatic analysis does not allow project-specific details of mitigation, resulting in an inherent uncertainty in the degree of mitigation that would ultimately need to be implemented to reduce the potentially significant impacts. Thus, implementation of mine methane capture projects may result in substantial impacts on recreation resources in Canada.

Impact Significance Determination

For the reasons described above, impacts on recreation resources would be potentially significant due to implementation of Cap-and-Trade offset protocols.

Mitigation Measures

Potential impacts on recreation could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

Mitigation Measure 16.b.i

Proponents for proposed renewable energy projects shall coordinate with Federal, State, and regional/local land management agencies with responsibilities for providing outdoor recreation opportunities where facilities are proposed on land supporting outdoor recreation resources, opportunities, or use. If facilities would displace, disrupt, reduce access to, or otherwise adversely affect recreation resources, opportunities, or use, the project siting and/or design shall be modified to the extent feasible to avoid or minimize the impact. Proponents shall also consult with affected outdoor recreation user groups. The information demonstrating that all feasible measures are being taken to

avoid or minimize the recreation impact shall be included in the necessary environmental review (i.e., CEQA and/or NEPA).

Mitigation Measure 16.b.ii

As described above, impacts related to mine methane offset protocol projects would be reduced to a less-than-significant level through implementation of existing regulations, including SMCRA, the Clean Water Act, and the Soil and Water Resources Conservation Act. However, in Canada, the U.S. federal government and CARB lack the authority to propose or implement these, or similar laws within Canada. Thus, the authority to determine project-level impacts and applicable regulations lies with the permitting agency for individual projects in Canada. Further, the programmatic analysis does not allow project-specific details of mitigation, resulting in an inherent uncertainty in the degree of mitigation ultimately implemented to reduce the potentially significant impacts. As a result, no mitigation is available to reduce potentially significant recreation impacts related to mine methane capture projects in Canada.

Post-Mitigation Significance Determination

Because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this Final~~Draft~~ EA does not attempt to address project-specific details of mitigation, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this Final~~Draft~~ EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that the potentially significant operational impact to recreation resources associated with new renewable energy projects related to renewable energy and energy efficiency, including SB 350 measures and increased stringency of the LCFS regulation and mine methane capture offset protocols in Canada would be **potentially significant and unavoidable**.

17. Transportation and Traffic

a) Impact 17.a: Construction-Related Impacts to Traffic and Transportation

As summarized in Chapter 2, section D.1, the reasonably foreseeable compliance responses associated with the ~~Proposed~~Scoping Plan would require construction activities. These impacts address the building phase of both reasonably foreseeable construction of new facilities or modification of existing facilities that involve earth-moving activities.

Although detailed information about potential specific construction activities is not currently available, it would be anticipated to result in short-term construction traffic

(primarily motorized) from worker commute- and material delivery-related trips. The amount of construction activity would vary depending on the type, number, and duration of usage for the varying equipment, and the phase of construction. These variations would affect the amount of project-generated traffic for both worker commute trips and material deliveries. Depending on the amount of trip generation and the location of new facilities, implementation could conflict with applicable programs, plans, ordinances, or policies (e.g., performance standards, congestion management); and/or result in hazardous design features and emergency access issues from road closures, detours, and obstruction of emergency vehicle movement, especially due to project-generated heavy-duty truck trips.

Implementation of covered entity compliance responses is not expected to result in significant adverse impacts to transportation or traffic. If a facility expands or requires construction to take place, increases in construction traffic would be temporary. Construction traffic impacts can be reduced through ingress and egress controls, traffic controls, and reduced speed zones to ensure safety. Activities undertaken to develop offset projects would be expected to vary per the type of offset project.

Impact Significance Determination

Therefore, construction-related impacts on traffic and transportation associated with the ~~Proposed~~Scoping Plan could be potentially significant.

Mitigation Measures

Potential impacts on transportation and traffic could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

Mitigation Measure 17.a

The Regulatory Setting in Attachment A includes applicable laws and regulations in regards to transportation. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local or State land use approval and/or permitting authority. New or modified facilities in California would qualify as a “project” under CEQA. The jurisdiction with primary approval authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices that are routinely required to avoid and/or minimize construction traffic impacts include:

- Proponents of new or modified facilities, or infrastructure constructed because of reasonably foreseeable compliance responses, would coordinate with State or local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements

(e.g., CEQA). The local or State land use agency or governing body must follow all applicable environmental regulations as part of approval of a project for development.

- Based on the results of the environmental review, proponents would implement all feasible mitigation to reduce or substantially lessen the potentially significant impacts of the project. Actions required to mitigate potentially significant traffic impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency.

    - Minimize the number and length of access, internal, service, and maintenance roads and use existing roads when feasible.

    - Provide for safe ingress and egress to/from the proposed project site. Identify road design requirements for any proposed roads, and related road improvements.

    - If new roads are necessary, prepare a road siting plan and consult standards contained in federal, State, or local requirements. The plans should include design and construction protocols to meet the appropriate roadway standards and be no larger than necessary to accommodate their intended functions (e.g., traffic volume and weight of vehicles). Access roads should be located to avoid or minimize impacts to washes and stream crossings, follow natural contours and minimize side-hill cuts. Roads internal to a project site should be designed to minimize ground disturbance. Excessive grades on roads, road embankments, ditches, and drainages should be avoided, especially in areas with erodible soils.

    - Prepare a Construction Traffic Control Plan and a Traffic Management Plan.

Post-Mitigation Significance Determination

Because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this Final~~Draft~~ EA does not attempt to address project-specific details of mitigation, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant traffic and transportation impacts.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this Final~~Draft~~ EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that construction-related traffic and transportation impacts

associated with the ~~Proposed~~Scoping Plan would be **potentially significant and unavoidable**.

b) Impact 17.b: Operational Impacts to Traffic and Transportation

As summarized in Chapter 2, section D.2, the reasonably foreseeable compliance responses associated with the ~~Proposed~~Scoping Plan would require long-term operational changes. These operational changes are related to implementation of methane reduction measures under SLCP, offset protocols associated with the Cap-and-Trade Program, and feedstock shipments related to more stringent requirements under the LCFS regulation.

i. LCFS Measures

Implementation of the ~~Proposed~~Scoping Plan could result in more stringent requirements under LCFS that would decrease the overall average CI level of California's fuel. While the total volume of fuel demanded in California is not anticipated to be affected by the recommended fuels regulations, it is anticipated to change the types of fuels consumed, which could result in substantial effects on local routes' traffic patterns due to differences in where feedstocks are sourced, and how the finished fuels are transported. These effects depend on feedstock demand and processing needs in an area. In addition, transportation patterns may change in relation to the location and operational shipping needs of new facilities. Depending on the number of trips generated and the location of fuel-related deliveries, implementation could conflict with applicable programs, plans, ordinances, or policies (e.g., performance standards, congestion management); and/or result in hazardous design features and emergency access issues from road closures, detours, and obstruction of emergency vehicle movement, especially due to project-generated heavy-duty truck trips.

The potential shift could affect agriculture-based ethanol pathways, resulting in a potential decrease in shipments of corn ethanol from California and elsewhere and an increase in shipments of sugarcane and molasses ethanol to California from Brazil and Central America. In addition, processing plants and collection/cultivation of feedstock for cellulosic ethanol production could increase in the United States and Canada, which would be provided to California via rail.

An attempt to determine the exact times and quantities of different types of low-carbon and alternative diesel fuels would be speculative. The location of export and import is based upon numerous unknown factors including: weather patterns, demand, and other economic drivers. While changes to the existing trade patterns can be anticipated, the ability to ship and receive products is within the purview of relevant international ports, train depots, and the companies buying and selling products. It is therefore reasonable to assume that the existing infrastructure would be expanded to meet a growing need for imports of low carbon and alternative diesel fuel to and within California.

Upon entering the State, low-carbon and alternative diesel fuels would be transported to appropriate facilities (e.g., blending facilities, distribution centers). While the proposed

fuels regulations would not affect the quantities of fuels demanded, it could have a significant effect on traffic patterns on local routes. These effects would be dependent on feedstock demand and processing needs in an area. It is expected that ethanol shipments into California ports would not likely increase significantly in the very short term due to infrastructure restraints. Shipments of ethanol that cannot be accommodated through the Panama Canal might enter through a U.S. port other than those in California (e.g., Houston) and be delivered to California by rail. Therefore, while ethanol shipments by rail from locations within the U.S. may decrease, they are expected to be replaced by ethanol shipments delivered to out-of-state ports. These variations would affect the amount of traffic for both worker commute trips and material deliveries. Depending on the amount of trip generation and the location of fuel-related deliveries, implementation could conflict with applicable programs, plans, ordinances, or policies (e.g., performance standards, congestion management); and/or result in hazardous design features and emergency access issues from road closures, detours, and obstruction of emergency vehicle movement, especially due to project-generated heavy-duty truck trips.

ii. SLCP Measures

Methane measures associated with the SLCP Strategy could include the operation of centralized anaerobic digesters, which could generate increased traffic levels on roadways due to movement of manure and organic waste from point of origin to the receiving facility. New fueling stations associated with digesters may increase traffic flows on local roads for on- and off-site fleets. In addition, monitoring of oil and gas facilities for the purpose of reducing escaped methane emissions would also generate an increase in miles traveled. Additionally, commute routes of future employees could generate increased daily trips. At this programmatic level of analysis, the location of these facilities cannot be determined; therefore impacts to applicable traffic plans cannot be accurately predicted at present.

iii. Cap-and-Trade Measures

Under the post-2020 Cap-and-Trade Offset Protocols, eligible offset credits would be generated through projects that are in conformance with all applicable environmental, health, and safety regulations. There would be minimal traffic trips resulting from the implementation of ODS, Rice Cultivation, U.S. Forest, and Urban Forest Offset Protocol projects, thus effects on traffic and transportation would not be significant (CARB 2010, CARB 2014a). Implementation of MMC projects could result in some short-term traffic from worker commute and material delivery trips; however, due to the isolated location of MMC offset projects, there would not be long-term adverse effects on transportation and traffic (CARB 2013).

The reasonably foreseeable compliance responses and impacts associated with implementation of offset protocols in Canada would be similar to those described above for mine methane capture and ODS projects. As discussed, there would not be significant impacts related to ODS or mine methane capture projects. Implementation of landfill projects in Ontario would involve installation of gas collection and control

systems, which would require minor modifications to existing waste facilities, thus not affecting existing traffic and transportation within and to a project site.

New livestock digesters could require the operation of heavy equipment on rural roads, potentially creating unsafe conditions. These types of impacts would be like those discussed above under Impact 17.a.

Impact Significance Determination

For the reasons discussed above, impacts on traffic and transportation could be potentially significant due to implementation of the reasonably foreseeable compliance responses associated with Cap-and-Trade offset protocols, methane reduction measures under SLCP, and changes to land uses resulting from increased stringency of LCFS.

Mitigation Measures

This impact could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of the CARB and not within its purview.

Mitigation Measure 17.b.i

The Regulatory Setting in Attachment A includes applicable laws and regulations in regards to transportation. CARB does not have the authority to require implementation of mitigation related to changes to traffic patterns; these must be addressed by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local or State land use approval and/or permitting authority. The jurisdiction with primary approval authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Local agencies with project-approval authority would need to consider changes in traffic patterns in their relevant traffic management plans, regional transportation plans, or other relevant documents. Recognized practices that are routinely required to avoid and/or minimize operational traffic impacts include:

- revisions to traffic signals,
- requirements to pay a fair share contribution to local traffic operation centers,
- coordination with Caltrans, or other relevant agencies, to broadcast real-time information on existing changeable message signs,
- consultation with local authorities to revise public transit system operations, and
- consultation with local emergency service provides to ensure that operating conditions on local roadways and freeway facilities are maintained.

Mitigation Measure 17.b.ii: Implement Mitigation Measure 17.a

Mitigation Measure 17.b.iii: Implement Mitigation Measure 17.a

Post-Mitigation Significance Determination

Because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this Final~~Draft~~ EA does not attempt to address project-specific details of mitigation, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this Final~~Draft~~ EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that the potentially significant operational impacts regarding traffic resulting from changes to existing traffic patterns associated with the ~~Proposed~~Scoping Plan would be **potentially significant and unavoidable**.

18. Utilities and Service Systems

a) Impact 18.a: Operational Impacts on Utilities and Service Systems

As summarized in Chapter 2, section D.2, the reasonably foreseeable compliance responses associated with the ~~Proposed~~Scoping Plan would require long-term operational changes.

Implementation of the ~~Proposed~~Scoping Plan could result in an increased rate in turnover of vehicle fleets to increase the use of zero-emission technologies. Generally, cars, trucks, buses, and other equipment that would be replaced because of the ~~Proposed~~Scoping Plan would be recycled or shipped for use outside of California. Vehicles that are recycled, rather than reused, would be subject to existing laws and regulations governing solid waste handling requirements. Disposal of any portion of vehicles, including batteries, would be subject to, and comply with existing laws and regulations governing solid waste, such as California's Universal Waste Rule (Cal. Code Regs., tit. 22, Chapter 23). There may be an increase in the amount of solid waste diverted to landfills because of increased fleet turnover rates; however, it would not be substantial enough to result in closure of an existing landfill or development of a new landfill because much of the vehicles and equipment would be recycled or scrapped.

Reasonably foreseeable compliance responses associated with the ~~Proposed~~Scoping Plan could result in new demand for water, wastewater, electricity, and gas services for new manufacturing facilities. Generally, facilities would be sited in areas with existing utility infrastructure—or areas where existing utility infrastructure is easily assessable. New or modified utility installation, connections, and expansion would be subject to the requirements of the applicable utility providers. Changes in land use, associated with

biofuel feedstock production are likely to change water demand to support new crop types, depending on the size, location, and existing uses. This could result in an increase or decrease in water demand, and would be subject to availability and regulatory requirements.

Any new or modified facilities, regardless of size and location, would be required to seek local or State land use approvals prior to their development. In addition, part of the land use entitlement process for facilities proposed in California requires that each of these projects undergo environmental review consistent with the requirements of CEQA and the CEQA Guidelines. It is assumed that facilities proposed in other states would be subject to comparable federal, State, and/or local environmental review requirements (e.g., CEQA) and that the environmental review process would assess whether adequate utilities and services (i.e., wastewater services, water supply services, solid waste facilities) would be available and whether the project would result in the need to expand or construct new facilities to serve the project. Through the environmental review process, utility and service demands would be calculated; agencies would provide input on available service capacity and the potential need for service-related infrastructure including expansions to waste water treatment plants, new water supply entitlements and infrastructure, storm water infrastructure, and solid waste handling capacity (e.g., landfills). Resulting environmental impacts would also be determined through this process.

At this time, the specific location and type of construction needs are not known and would be dependent upon a variety of market factors that are not within the control of CARB including: economic costs, product demands, environmental constraints, and other market constraints. Thus, the specific impacts from construction on utility and service systems cannot be identified with any certainty, and individual compliance responses could potentially result in significant environmental impacts for which it is unknown whether mitigation would be available to reduce the impacts.

The improved maintenance and monitoring of oil and gas facilities would not result in any impacts to utilities and service systems in that exceedance of local Regional Water Quality Control Board (RWQCB) standards for wastewater would not occur. Also, implementation of this compliance response would not result in the construction of new or expanded wastewater treatment or storm water drainage facilities, landfill servicing, or the generation of solid waste.

Lagoon-based systems use a substantial amount of water, primarily related to dilution requirements for land application. Conversion to non-lagoon systems (i.e., scrape based systems, irrigation of pastures, and use of digesters) would demand water; however, it would be expected to be substantially less than the demand associated with lagoons. Thus, implementation of the ~~Proposed~~Scoping Plan would reduce water demands related to dairies in California.

Methods to reduce fugitive methane emissions include the operation of anaerobic digesters across several sectors. Animal, organic, and human waste can be

anaerobically digested to produce controlled methane, which can then be captured and used as a renewable energy source. It should be noted that the water demands of digesters vary depending on size, scale, capacity, and feedstock (product to be digested); therefore, water demand is not consistent as varying combinations of facility size and feedstock dryness dictate water needs. Further, anaerobic digesters produce digestate, which can be managed in several ways: compost, land applications, fertilizer, and landfill cover. Therefore, it can be assumed that a digester could potentially need landfill servicing.

Dairy, organic waste, and wastewater treatment anaerobic digesters are discussed with respect to utilities and service systems independently below. As a compliance response to the methane reduction measures, dairies could construct on-site digesters as a method of manure management. As the current flush-water method of manure management requires a large amount of water, dairies that adopt on-site digestion would have sufficient water supplies for operation, and would not require the construction or expansion of wastewater treatment facilities. On-site digesters would result in new impermeable surfaces; however, this area would be small in comparison to the dairy and would not affect stormwater flow. Stormwater facilities would not need to be constructed.

Development of off-site centralized dairy digester facilities could require new water and wastewater treatment facilities or connection to a municipal system. Water would be required to increase the liquid content of manure feedstock as well as water down the resulting effluent; however, this water could be non-potable. Digesters located near dairy facilities could be supplied by groundwater or irrigation districts; digesters within urban areas would be supplied by a municipal source. Domestic water use (e.g., restrooms for employees) could be serviced by septic systems, or, for digesters near urban areas, could connect to a municipal system. Additionally, compliance with WDRs, NPDES and SWPPP permitting, and additional local permits as discussed in Section 10, "Hydrology and Water Quality," would ensure that exceedance of local RWQCB wastewater treatment requirements would not occur (RWQCB 2010). Construction of new or expanded storm water drainage facilities could result from the development of off-site digesters, but as the location of these facilities is uncertain, the conditions under which a facility may require supplemental storm water management cannot be predicted nor adequately analyzed.

Anaerobic digesters constructed for the management of organic waste could create additional strains on utilities and service systems. Organic waste digesters constructed within the vicinity of an existing solid waste disposal facility would likely not require supplemental water, but those constructed independently would need to connect to a municipal source or use a groundwater well. Organic waste digesters may dispose of resulting digestate by distributing it amongst various agricultural areas or convey it to a wastewater treatment facility. The latter would put additional pressure on wastewater facilities to comply with the treatment and disposal requirements of the SWRCB and the local RWQCB (CalRecycle 2011). The locations of these facilities is, at this time,

uncertain, and therefore supplemental storm water drainage facilities could be required with project implementation depending on the characteristics of future project sites.

A potential compliance response would be the expansion of wastewater treatment facilities to adopt the process of anaerobic digestion, expand existing anaerobic digesters, and potentially dispose of digestates originating from other facilities. Unlike the digesters discussed above, no new wastewater treatment plants would need to be constructed to comply with the methane reduction measures. These facilities would be modified to increase capacity of anaerobic digestion. Wastewater treatment plants inherently receive a stable source of water; therefore, increased levels of digestion would not exceed water supplies available. Further, plants cannot operate without complying with the wastewater treatment requirements established by the governing RWQCB and SWRCB. Digestate could be disposed of on-site. It would not be expected that construction or expansion of storm water drainage facilities would be required.

The operation of digester systems at dairies, organic compost facilities, and wastewater treatment plants designed to export electricity or biogas for off-site use or consumption could potentially create impacts for electric and gas utilities and their service systems. Exported electricity generated by digesters would necessitate interconnection with the local electricity distribution grid and may require safety equipment and engineering upgrades to local distribution systems owned and operated by electric utilities. The export or injection of digester-derived biogas into natural gas pipeline systems would require interconnection infrastructure with local utility-owned pipeline systems and may require biogas upgrading to meet the constituency standards and heating values of their pipeline systems. (Note that CEC and CPUC are currently involved in proceedings for biomethane under AB 1900; see Attachment A.)

Any new or modified facilities, no matter their size and location would be required to seek local or State land use approvals prior to their development. In addition, part of the land use entitlement process for facilities proposed in California requires that each of these projects undergo environmental review consistent with the requirements of CEQA and the CEQA Guidelines. Through the environmental review process, utility and service demands would be calculated; agencies would provide input on available service capacity and the potential need for service-related infrastructure including expansions to wastewater treatment plants, new water supply entitlements and infrastructure, storm water infrastructure, and solid waste handling capacity (e.g., landfills). Resulting environmental impacts would also be determined through this process. Thus, there could be significant operational impacts on utilities and services systems associated with implementation of methane reduction measures under the SLCP Strategy.

Implementation of renewable energy and energy efficiency, including SB 350 measures and increased stringency of LCFS would increase the number of renewable energy projects. All renewable energy projects no matter their size, location within the State or out-of-state, or type would be required to seek local land use approvals prior to their implementation. Part of the land use entitlement process would be to determine whether

there is adequate water available to serve the proposed development. In the case of the proposed renewable energy projects, most of the project types would have minimal water demands (i.e., wind power, solid-fuel biomass, geothermal, and biogas gas) primarily related to municipal use, maintenance, and landscaping. However, the solar thermal, solar photovoltaic, and small hydroelectric renewable energy projects could have substantial water demands because of the use of water in the electricity generation, operation, or maintenance process. Nonetheless, all project types would be required to seek the approvals of local water service agencies indicating that adequate water supplies exist to serve the project. For projects located in California and that exceed adopted thresholds, a WSA would need to be prepared and approved by the local water purveyor.

Part of the land use entitlement process would be to determine whether there is adequate wastewater treatment and conveyance capacity is available to serve the proposed development. For those projects that would receive wastewater treatment service from an agency or other provider, it is assumed that all necessary permits and waste discharge requirements have been secured such that the discharge from these facilities would not exceed any adopted requirements. Further, these treatment facilities would be regularly monitored to ensure they are meeting compliance requirements For those renewable energy projects that would be served by an individual septic system or on-site treatment facility, it is anticipated that these facilities would comply with appropriate wastewater treatment requirements because appropriate permits and approvals from the RWQCB, land use agency, or other regulatory agency specifying treatment requirements would be required prior to construction of the project.

All renewable energy projects would be provided solid waste from a local provider that would haul the solid waste to an approved and permitted disposal facility. Some of the renewable energy projects may result in the generation of hazardous solid waste. In these cases, the project operators would contract with haulers certified to handle the hazardous waste and would dispose of the waste at a permitted facility that accepts hazardous waste.

Impact Significance Determination

For the reasons described above, operational impacts related to implementation of proposed measures under the ~~Proposed~~Scoping Plan could result in potentially significant impacts related to demands on utilities and service systems.

Mitigation Measures

This impact could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of the CARB and not within its purview.

Mitigation Measure 18.a.i

The Regulatory Setting in Attachment A includes applicable laws and regulations that relate to utilities and service systems. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local or State land use approval and/or permitting authority. New or modified facilities in California would qualify as a "project" under CEQA. The jurisdiction with primary approval authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices that are routinely required to avoid and/or minimize utility and service-related impacts include:

- Proponents of new or modified facilities, or infrastructure constructed because of reasonably foreseeable compliance responses, would coordinate with State or local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local or State land use agency or governing body must follow all applicable environmental regulations as part of approval of a project for development.

- Based on the results of the environmental review, proponents would implement all feasible mitigation to reduce or substantially lessen the potentially significant impacts of the project. Actions required to mitigate potentially significant utility or service-related impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency.

    - Comply with local plans and policies regarding the provision of water supply, wastewater treatment, and storm water drainage utilities, and solid waste services.

    - Where an on-site wastewater system is proposed, submit a permit application to the appropriate local jurisdiction.

    - Where appropriate, prepare a Water Supply Assessment (WSA) consistent with the requirements of Section 21151.9 of the Public Resources Code Section 10910 et seq. of the Water Code. The WSA would be approved by the local water agency/purveyor prior to construction of the project.

    - Comply with local plans and policies regarding the provision of wastewater treatment services.

Post-Mitigation Significance Determination

Because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this Final~~Draft~~ EA does not attempt to address project-specific details of mitigation, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this Final~~Draft~~ EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that the potentially significant impact to utilities and service systems resulting from the operation of new facilities associated with the ~~Proposed~~Scoping Plan would be **potentially significant and unavoidable**.

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5.0 CUMULATIVE AND GROWTH-INDUCING IMPACTS

A. Introduction

Cumulative impacts are impacts on the environment that result from the incremental impacts of a proposed project when added to other past, present, and reasonably foreseeable future actions. (Cal. Code Regs., tit. 14, § 15355(b).) Cumulative impacts can result from individually minor but collectively significant actions taking place over time.

Although the California Air Resources Board (CARB) is exempt from the requirement to prepare environmental impact reports (EIRs), CARB followed the general guidance of the California Environmental Quality Act (CEQA) Guidelines for considering the cumulative impacts of implementation of the recommended actions included in the ~~Proposed~~Scoping Plan. The CEQA Guidelines state that cumulative impacts should be addressed when the cumulative impacts are expected to be significant and when the project's incremental contribution to the impact is cumulatively considerable. (Cal. Code Regs., tit. 14, § 15130, subd. (a).) Section 15130 of the CEQA Guidelines states that the discussion of cumulative impacts need not provide as much detail as the discussion of impacts attributable to the project alone. Where a lead agency is examining a project with an incremental impact that is not "cumulatively considerable," a lead agency need not consider that impact significant, but must briefly describe its basis for concluding that the incremental impact is not cumulatively considerable.

EIRs must consider "other projects creating related impacts." (Cal. Code Regs., tit. 14, § 15130(a)(1).) CEQA Guidelines section 15355(b) requires an analysis of "other closely related past, present, and reasonably foreseeable probable future projects." Because of the statewide reach of the Proposed Strategy for Achieving California's 2030 Greenhouse Gas Target (~~Proposed~~Scoping Plan) and the longer-term future horizon for the greenhouse gas (GHG) emission reduction achievements, the impact analysis of the resource topics in Chapter 4 of this Final~~Draft~~ Environmental Analysis (EA) is inherently programmatic and cumulative in nature, rather than site or project specific. As a result, the character of the impact conclusions in the resource-oriented sections of Chapter 4 are cumulative by considering the potential impacts of the full range of reasonably foreseeable compliance responses, along with expected background growth in California, as appropriate.

This section, therefore, summarizes the cumulative and growth-inducing impacts associated with the recommended actions in the ~~Proposed~~Scoping Plan for each resource topic evaluated in this Final~~Draft~~ EA.

B. Cumulative Impacts

1. Aesthetics

Implementation of the reasonably foreseeable compliance responses associated with the recommended actions in the ~~Proposed~~Scoping Plan could require construction and operational activities associated with new or modified facilities or infrastructure (e.g., manufacturing plants, renewable energy facilities, lithium mining). There is uncertainty as to the exact location of these new facilities or the modification of existing facilities. Construction and operation of these facilities (although likely to occur in areas zoned or used for manufacturing or industrial purposes), could conceivably introduce or increase the presence of artificial elements (e.g., heavy-duty equipment, removal of existing vegetation, buildings) in areas of scenic importance, such as visibility from a State scenic highways. The visual impact of such development would depend on several variables, including the type and size of facilities, distance and angle of view, visual absorption and placement in the landscape. In addition, facility operation may introduce significant sources of glare, exhaust plumes, and nighttime glare from lighting for safety and security purposes. Implementation of mitigation measures would not reduce these impacts to a less-than-significant level because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects. Thus, implementation of the recommended actions in the ~~Proposed~~Scoping Plan **could result in a considerable contribution to a cumulative aesthetics-related impact**.

2. Agricultural and Forest Resources

Implementation of the reasonably foreseeable compliance responses associated with the recommended actions in the ~~Proposed~~Scoping Plan could include construction and operational activities associated with new or modified facilities or infrastructure (e.g., manufacturing plants, renewable energy projects). In addition, demand for feedstock could displace food-based production on agricultural land currently used for row crops, orchards, and grazing. This increased demand could potentially result in indirect land use changes where food-based agriculture could shift to other areas; thereby, increasing pressure for conversion of rangeland, grassland, forests, and other uses to agriculture. There is uncertainty as to the exact location of these new facilities or the modification of existing facilities. Construction of new facilities could result in the conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, Williamson Act conservation contracts, or forest land or timberland, resulting in the loss of these resources. Because CARB has no land use authority, mitigation is not within its purview to reduce potentially significant impacts to less-than-significant levels. Compliance with existing land use policies, ordinances, and regulations would serve to minimize this impact. Land use impacts would be further addressed for individual projects through the local development review process. Mitigation measures were identified that could reduce these impacts that would be applied through the development review process. However, because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies

for individual projects, and because of the programmatic nature of this Final~~Draft~~ EA, impacts were determined to be potentially significant and unavoidable. Thus, the ~~Proposed~~Scoping Plan **could result in a considerable contribution to a cumulative impact to agricultural and forest resources**.

3. Air Quality

The ~~Proposed~~Scoping Plan contains measures that would reduce GHG emissions in California. These measures would increase process changes, such as increased renewable energy procurement, reduce vehicle miles travelled (VMT) within regions of the State, and a Post-2020 Cap-and-Trade Program. Overall, while there would be some criteria air pollutant emissions and toxic air contaminants (TACs) associated with operations of the ~~Proposed~~Scoping Plan, in the long-term the measures in the plan would result in beneficial operational impacts. Therefore the ~~Proposed~~Scoping Plan would have **no contributions to a cumulative impact on operational air quality.**

Reasonably foreseeable compliance responses associated with the recommended actions in the ~~Proposed~~Scoping Plan would require construction activities that may result in emissions of criteria air pollutants and TACs, as well as generate unpleasant odors that could affect sensitive receptors. These emissions would be temporary and occur intermittently depending on the intensity of construction on a given day. Although detailed construction information is not available at this time, based on the types of activities that could be conducted, it would be expected that the primary sources of construction-related emissions include soil disturbance- and equipment-related activities (e.g., use of backhoes, bulldozers, excavators, and other related equipment). Based on typical emission rates and other parameters for above- mentioned equipment and activities, construction activities could result in hundreds of pounds of daily NOx and PM emissions (i.e., the amount generated from two to four pieces of heavy-duty equipment working eight hours per day), which may exceed general mass emissions limits of a local or regional air quality management district depending on the location of the emissions. Part of the land use entitlement process requires that each of these projects undergo environmental review consistent with California environmental review requirements (e.g., CEQA) and other applicable local requirements (e.g., local air district rules and regulations).

Implementation of mitigation measures could potentially reduce construction-related air quality impacts; however, because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this Final~~Draft~~ EA does not attempt to address project-specific details of mitigation. There is inherent uncertainty in the degree of mitigation that may ultimately by implemented to reduce potentially significant impacts.

Consequently, this Final~~Draft~~ EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that construction-related air quality impacts resulting from the development of new facilities

or modification of existing facilities could be potentially significant and unavoidable. Thus, the ~~Proposed~~Scoping Plan **could result in a considerable contribution to a cumulative construction-related air quality impact**.

4. Biological Resources

Implementation of reasonably foreseeable compliance responses could require construction and operational activities associated with new or modified facilities or infrastructure. There is uncertainty as to the exact location of these new facilities or the modification of existing facilities. Construction could require disturbance of undeveloped area, such as clearing of vegetation, earth movement and grading, trenching for utility lines, erection of new buildings, and paving of parking lots, delivery areas, and roadways. These activities would have the potential to adversely affect biological resources (e.g., species, habitat) that may reside or be present in those areas. Because there are biological species that occur, or even thrive, in developed settings, resources could also be adversely affected by construction and operations within disturbed areas at existing manufacturing facilities or at other sites in areas with zoning that would permit the development of manufacturing or industrial uses. In addition, new regulations could affect biological resources depending on the type of crop, location, and need to convert lands, habitat destruction could occur, resulting in the loss of biodiversity. The location of new crop lands may affect conservation plans or disrupt important migratory routes. Indirect effects could occur as well, such as increased pesticide and nutrient use, the runoff of which could be detrimental to individual species.

The biological resources that could be affected by construction and operation associated with implementation of new regulations and/or incentive measures, would depend on the specific location of any necessary construction and its environmental setting. Harmful impacts could include modifications to existing habitat; including removal, degradation, and fragmentation of riparian systems, wetlands, or other sensitive natural wildlife habitat and plan communities; interference with wildlife movement or wildlife nursery sites; loss of special-status species; and/or conflicts with the provisions of adopted habitat conservation plans, natural community conservation plans, or other conservation plans or policies to protect natural resources. Implementation of mitigation measures would not reduce these impacts to a less-than-significant level. Thus, the ~~Proposed~~Scoping Plan **could result in a considerable contribution to a cumulative impact on biological resources**.

5. Cultural Resources

Implementation of reasonably foreseeable compliance responses associated with the recommended measures in the ~~Proposed~~Scoping Plan could require construction activities associated with new or modified facilities or infrastructure (e.g., new manufacturing plants, renewable energy projects). There is uncertainty as to the exact location of these new facilities or the modification of existing facilities. Construction activities could require disturbance of undeveloped area, such as clearing of vegetation, earth movement and grading, trenching for utility lines, erection of new buildings, and

paving of parking lots, delivery areas, and roadways. Demolition of existing structures may also occur before the construction of new buildings and structures. The cultural resources that could potentially be affected by ground disturbance activities could include, but are not limited to, prehistoric and historical archaeological sites, paleontological resources, historic buildings, structures, or archaeological sites associated with agriculture and mining, and heritage landscapes. Properties important to Native American communities and other ethnic groups, including tangible properties possessing intangible traditional cultural values, also may exist. Historic buildings and structures may also be adversely affected by demolition-related activities. Such resources may occur individually, in groupings of modest size, or in districts. Because culturally sensitive resources can also be located in developed settings, historic, archeological, and paleontological resources, and places important to Native American communities, could also be adversely affected by construction of new facilities. Implementation of mitigation measures could reduce these impacts, however because the authority to determine specific project-level impacts and mitigation is outside the purview of CARB, any mitigation identified would not reduce these impacts to a less-than-significant level. Thus, the ~~Proposed~~Scoping Plan **could result in a considerable contribution to a cumulative impact on cultural resources**.

6. Energy Conservation

Implementation of reasonably foreseeable compliance responses associated with the ~~Proposed~~Scoping Plan could require construction and operational activities associated with new or modified facilities or infrastructure. Temporary increases in energy demand associated with new facilities would include fuels used during construction, and gas and electric operational demands. Typical earth-moving equipment that may be necessary for construction includes: graders, scrapers, backhoes, jackhammers, front-end loaders, generators, water trucks, and dump trucks. While energy would be required to complete construction for any new or modified facilities or infrastructure projects, it would be temporary and limited in magnitude and would not result in sustained increases in demand that would adversely affect energy supplies.

The ~~Proposed~~Scoping Plan contains the following programs: SLCP Reduction Strategy; State SIP Strategy measures; SB 375 Sustainable Community Strategies – Increased Stringency of 2035 Targets; LCFS – Increased Stringency (18 percent CI by 2030); Behind-the-Meter Photovoltaic (PV) Systems (approximately 10 gigawatts [GW] or more); Achieve 50 Percent Renewable Portfolio Standard (RPS) by 2030 (SB 350, the Clean Energy and Pollution Reduction Act of 2015 [Statues of 2015, De León]); Doubling of Energy Efficiency by 2030 (SB 350); Demand Response and Flexible Loads; and Post-2020 Cap-and-Trade Program with Declining Caps and Linkage to Ontario, Canada~~; and 20 Percent Reduction in GHGs at Refineries~~. As discussed in Chapter 2 of this Final~~Draft~~ EA, these programs would reduce energy demands, decrease reliance on fossil fuels and increase reliance on renewable energy sources.

Overall, while there would be some use of non-renewable resources for construction projects, the ~~Proposed~~Scoping Plan would reduce energy demands, decrease reliance

on fossil fuels and increase reliance on renewable energy sources. Thus, there would be **no contributions to a cumulative impact on energy conservation**.

7. Geology and Soils

Implementation of the reasonably foreseeable compliance responses associated with the recommended actions in the ~~Proposed~~Scoping Plan could require construction and operational activities associated with new or modified facilities or infrastructure (e.g., manufacturing plants, new renewable energy facilities). In addition, implementation of new fuels regulations could increase or change agricultural practices (see Section 2, Agriculture and Forest Resources). The detrimental effects of agricultural practices on soil quality include erosion, desertification, salinization, compaction, and pollution. Loss of topsoil can increase erosion rates and affect water quality, which may be exacerbated through increased use of nutrients and pesticides.

There is uncertainty as to the exact location of these new facilities or the modification of existing facilities. Construction and operation could be located in a variety of relatively high-risk geologic and soil conditions that are considered to be potentially hazardous. For instance, the seismic conditions at the site of a new facility may have high to extremely high seismic-related fault rupture and ground shaking potential associated with earthquake activity. New facilities could also be subject to seismic-related ground failure, including liquefaction and landslides. Construction and operational activities could be located in a variety of geologic, soil, and slope conditions with varying amounts of vegetation that would be susceptible to soil erosion. Strong ground shaking could also trigger landslides in areas where the natural slope is naturally unstable or is over-steepened by the construction of access roads and structures. Construction and operation could also occur in locations that would expose facilities and structures to expansive soil conditions. Development of new facilities could be susceptible to the presence of expansive soils particularly in areas of fine-grained sediment accumulation typically associated with playas, valley bottoms, and local low-lying areas.

The specific design details, siting locations, seismic hazards, and geologic, slope, and soil conditions for any particular facilities that could occur as a result of reasonably foreseeable compliance responses are not known at this time and would be analyzed on a site-specific basis at the project level. Therefore, for purposes of this analysis, development of these facilities could expose people and structures to relatively high levels of risk associated with strong seismic ground shaking, including liquefaction and landslides, and instability. These geologic, seismic, and soil-related conditions could result in damage to structures, related utility lines, and access roads, blocking access and posing safety hazards to people.

Because the authority to determine project-level impacts and require project-level mitigation lies with the land use approval and/or permitting agency for individual projects, and since the programmatic analysis does not allow project-specific details of mitigation, there is inherent uncertainty in the degree of mitigation ultimately implemented to reduce the potentially significant impacts. Thus, the ~~Proposed~~Scoping

Plan **could result in a considerable contribution to a cumulative impact on geology and soils**.

8. Greenhouse Gases

Implementation of reasonably foreseeable compliance responses could require construction activities associated with new or modified facilities or infrastructure. Specific, project-related construction activities could result in increased generation of short-term GHG emissions in limited amounts associated with the use of heavy-duty off-road equipment, materials transport, and worker commutes. As described in Chapter 4, a majority of local agencies (e.g., air pollution control districts) do not recommend or require the quantification of short-term construction-generated GHGs for typical construction projects because these only occur for a finite period of time (e.g., during periods of construction) that is typically much shorter than the operational phase, and agencies generally recommended that GHG analyses focus on operational phase emissions, unless the project is of a unique nature requiring atypical (e.g., large scale, long-term) activity levels (e.g., construction of a new dam or levee) for which quantification and consideration (e.g., amortization of construction emissions over the lifetime of the project) may be recommended. Thus, short-term construction related GHG emission impacts associated with reasonably-foreseeable compliance responses for the recommended actions in the ~~Proposed~~Scoping Plan are considered less-than-significant when considered in comparison to the overall GHG reduction associated with implementation of the ~~Proposed~~Scoping Plan.

The long-term operational impacts to GHG emissions from the recommended actions are primarily beneficial, consistent with the goals and objectives of the ~~Proposed~~Scoping Plan to reduce emissions to achieve 2020 and post-2020 emission reduction goals.

Thus, the ~~Proposed~~Scoping Plan **would not result in a considerable contribution to a cumulative GHG emissions impact.**

9. Hazards and Hazardous Materials

Reasonably foreseeable compliance responses to the recommended measures in the ~~Proposed~~Scoping Plan could include construction and operation of new or modified facilities or infrastructure. There is uncertainty as to the exact locations where construction and operations of new facilities or the modification of existing facilities would occur.

These construction activities may require the transport, use, and disposal of hazardous materials. Construction activities generally use heavy-duty equipment requiring periodic refueling and lubricating fluids. Large pieces of construction equipment (e.g., backhoes, graders) are typically fueled and maintained at the construction site as they are not designed for use on public roadways. Thus, such maintenance uses a service vehicle that mobilizes to the location of the construction equipment. It is during the transfer of

fuel that the potential for an accidental release is most likely. Although precautions would be taken to ensure that any spilled fuel is properly contained and disposed, and such spills are typically minor and localized to the immediate area of the fueling (or maintenance), the potential still remains for a significant release of hazardous materials into the environment. Consequently, construction activities could create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.

In addition, because potential facilities would likely occur within footprints of existing manufacturing facilities, the ~~Proposed~~Scoping Plan would not be expected to result in locating new facilities near schools, public (or public use) airports, private airstrips, or wildlands; or on sites included on a list of hazardous materials sites or impair implementation of or physically interfere with an adopted emergency response or evacuation plan. In addition, as noted above, the handling of hazards materials would be required to comply with all applicable federal, State and local laws. As a result, operational impacts associated with the ~~Proposed~~Scoping Plan on hazards and hazardous materials would be less-than-significant. However, since mine methane capture offset projects located within Canada are outside of the jurisdiction of the applicable federal, State and local laws, hazards and hazardous materials impacts related to implementation of these projects could be significant.

Mitigation measures are available that would reduce these impacts to a less-than-significant level; however, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts and the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects. Thus, the ~~Proposed~~Scoping Plan **could result in a considerable contribution to a cumulative impact to hazards and hazardous materials**.

10. Hydrology and Water Quality

Construction activities and long-term operations associated with reasonably foreseeable compliance responses to the recommended actions could be located in a variety of conditions with regards to altering drainage patterns, flooding, and inundation by seiche, tsunami, or mudflow. The level of susceptibility varies by location. In addition, renewable energy projects may require quantities of groundwater that would deplete existing water resources. Furthermore, fuels regulations could alter agricultural practices, resulting in discharges to waterways of sediment, nutrients, pathogens, pesticides, metals, and salts. The specific design details, siting locations, and associated hydrology and water quality issues are not known at this time and would be analyzed on a site-specific basis at the project level. Therefore, for purposes of CEQA disclosure, these potential hydrology and water quality-related impacts could be significant. Implementation of mitigation measures to reduce these impacts would not reduce these impacts to a less-than-significant level because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for

individual projects. Thus, the ~~Proposed~~Scoping Plan **could result in a considerable contribution to a cumulative impact to hydrology and water quality**.

11. Land Use and Planning

Implementation of reasonably foreseeable compliance responses associated with the recommended actions in the ~~Proposed~~Scoping Plan could require both construction and long-term operation of new or modified facilities or infrastructure. There is uncertainty as to the exact location of these new facilities or the modification of existing facilities. Facilities would likely occur within the footprints of existing manufacturing facilities, or in areas with zoning that would permit the development these facilities. Implementation of the ~~Proposed~~Scoping Plan would also include avoided deforestation through Forest Offset Protocols. Because avoided conversion projects could occur on land planned for other, non-forest uses and, if so, would prevent the planned non-forest use from occurring, avoided conversion projects could conflict with local land use plans. Thus, implementation of the recommended actions could divide an established community or conflict with a land use or conservation plan. Therefore, the ~~Proposed~~Scoping Plan **would result in a considerable contribution to a cumulative land use planning-related impact**.

12. Mineral Resources

Implementation of reasonably foreseeable compliance responses associated with the recommended actions in the ~~Proposed~~Scoping Plan could require both the construction and operation of new or modified facilities or infrastructure. There is uncertainty as to the exact location of these new facilities or the modification of existing facilities. New facilities would likely occur within existing footprints or in areas with consistent zoning, where original permitting and analyses considered these issues, and thus impacts to the availability of a known mineral resource or recovery site would be less-than-significant. Some of the recommended actions and associated compliance responses could require the extraction of minerals (i.e., lithium) used to manufacture batteries. However, implementation of these measures would not significantly deplete the supply of lithium.

Therefore, the ~~Proposed~~Scoping Plan **would not result in a considerable contribution to a cumulative impact to mineral resources**.

13. Noise

Implementation of reasonably foreseeable compliance responses associated with the recommended actions in the ~~Proposed~~Scoping Plan could require construction and operation of new or modified facilities or infrastructure. Operational activities, including operation of anaerobic digesters and renewable energy projects could also contribute to increased noise levels. These activities could result in the generation of short-term construction noise in excess of applicable standards or that result in a substantial increase in ambient levels at nearby sensitive receptors, and exposure to excessive vibration levels, which would be potentially significant. In addition, operational noise

related to new facilities, mining operations, and renewable energy projects could emit excessive levels of noise near sensitive receptors. Thus, operational effects of equipment constructed as a result of implementation of recommended actions associated with ~~Proposed~~Scoping Plan could result in potentially significant impacts. Implementation of mitigation measures could reduce potential construction-related or operational noise impacts to a less-than-significant level; however, the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects. Thus, the ~~Proposed~~Scoping Plan **could result in a considerable contribution to a cumulative construction-related noise impact**.

14. Population and Housing

Implementation of reasonably foreseeable compliance responses associated with the recommended actions in the ~~Proposed~~Scoping Plan could require construction and operation of new or modified facilities or infrastructure. There is uncertainty as to the exact location of these new facilities or the modification of existing facilities. These would likely occur within footprints of existing facilities, or in areas with zoning that would permit the development of such facilities. Construction of these facilities would require relatively small crews, and demand for these crews would be temporary (e.g., 6 – 12 months per project). Therefore, a substantial amount of construction worker migration would not be likely to occur, and a sufficient construction employment base would likely be available. Construction activities would not require new additional housing or generate changes in land use. Therefore, the ~~Proposed~~Scoping Plan **would not result in a considerable contribution to a cumulative impact related to population and housing growth**.

15. Public Services

Reasonably foreseeable compliance responses associated with the recommended actions in the ~~Proposed~~Scoping Plan could include construction and operation of new or modified facilities or infrastructure. There is uncertainty as to the exact location of these new facilities or the modification of existing facilities. These would likely occur within footprints of existing facilities, or in areas with zoning that would permit the development of these facilities. Construction activities would be anticipated to require relatively small crews, and demand for these crews would be temporary (e.g., 6 – 12 months per project). Therefore, it would be anticipated that the need for a substantial amount of construction worker migration would not occur and that a sufficient construction employment base would likely be available. Construction activities would not require new additional housing to accommodate or generate changes in land use and, therefore, would not affect the provision of public services. Therefore, the ~~Proposed~~Scoping Plan **would not result in a considerable contribution to a cumulative impact related to public services**.

16. Recreation

Implementation of reasonably foreseeable compliance responses associated with the recommended actions in the ~~Proposed~~Scoping Plan could require construction and operations of new or modified facilities or infrastructure. There is uncertainty as to the exact locations of potential new or modified facilities. These activities would likely occur within footprints of existing facilities, or in areas with zoning that would permit their development. In addition, demand for construction crews would be temporary (e.g., 6 – 12 months per project). Therefore, it would be anticipated that the need for a substantial amount of construction worker migration would not occur and that a sufficient construction employment base would likely be available. Thus, construction activities associated with reasonably foreseeable compliance responses would not be anticipated to increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration would occur. In addition, the demand for new (or expansion of) recreational-related facilities would not occur as a result of construction activities. However, implementation of mine methane capture projects associated with linkage of Cap-and-Trade with Ontario and new renewable energy projects could be located on recreational land or in close proximity to recreation resources. Therefore, the ~~Proposed~~Scoping Plan **would result in a considerable contribution to a cumulative impact related to recreational facilities**.

17. Transportation and Traffic

Implementation of reasonably foreseeable compliance responses associated with the recommended actions in the ~~Proposed~~Scoping Plan could require construction and operations of new or modified facilities or infrastructure. In addition, new fuels standards could result in changes to imports and statewide shipments of feedstock and distribution of fuels. Although detailed information about potential specific construction activities is not currently available, some of the potential compliance responses could result in short-term construction traffic (primarily motorized) from worker commute- and material delivery-related trips. The amount of construction activity would vary depending on the particular type, number, and duration of usage for the varying equipment, and the phase of construction. These variations would affect the amount of project-generated traffic for both worker commute trips and material deliveries. Depending on the amount of trip generation and the location of new facilities, implementation could conflict with applicable programs, plans, ordinances, or policies (e.g., performance standards, congestion management); and/or result in hazardous design features and emergency access issues from road closures, detours, and obstruction of emergency vehicle movement, especially due to project-generated heavy-duty truck trips. As a result, transportation and traffic impacts during construction projects associated with the ~~Proposed~~Scoping Plan would be potentially significant.

Depending on the amount of trip generation and the location of fuel-related deliveries, implementation could conflict with applicable programs, plans, ordinances, or policies (e.g., performance standards, congestion management); or result in hazardous design

features and emergency access issues from road closures, detours, and obstruction of emergency vehicle movement, especially due to project-generated heavy-duty truck trips.

Implementation of mitigation measures could reduce short-term construction related impacts to a less-than-significant level, but because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, the impacts are considered potentially significant and unavoidable. Thus, the ~~Proposed~~Scoping Plan **could result in a considerable contribution to a cumulative transportation and traffic-related impact**.

18. Utility Service Systems

Implementation of reasonably foreseeable compliance responses associated with the recommended actions in the ~~Proposed~~Scoping Plan could require construction and operations of new or modified facilities or infrastructure (e.g., manufacturing facilities, renewable energy projects, anaerobic digesters). Newly constructed or modified facilities could generate substantial increases in the demand for water supply, wastewater treatment, storm water drainage, and solid waste services in their local areas. Any new or modified facilities, no matter their size and location would be required to seek local or State land use approvals prior to their development. Part of the land use entitlement process for facilities proposed in California requires that each of these projects undergo environmental review consistent with the requirements of CEQA and the State CEQA Guidelines. It is assumed that facilities proposed in other states would be subject to comparable federal, state, and/or local environmental review requirements (e.g., CEQA) and that the environmental review process would assess whether adequate utilities and services (i.e., wastewater services, water supply services, solid waste facilities) would be available and whether the project would result in the need to expand or construct new facilities to serve the project.

At this time, the specific location and type of construction needs is not known and would be dependent upon a variety of market factors that are not within the control of CARB including: economic costs, product demands, environmental constraints, and other market constraints. Thus, the specific impacts from construction on utility and service systems cannot be identified with any certainty, and individual compliance responses could potentially result in significant environmental impacts.

Implementation of mitigation measures would not reduce these impacts to a less-than-significant level because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects. Thus, the ~~Proposed~~Scoping Plan **could result in a considerable contribution to a cumulative impact with respect to utilities and service systems**.

C. Growth-Inducing Impacts

As noted above, the ~~Proposed~~Scoping Plan would not directly result in any growth in population or housing. A detailed analysis of economic growth is provided in Appendix E

of the ~~Proposed~~Scoping Plan. As discussed, effects on the California economy are anticipated to be modest, and would not result in substantial economic growth. Thus, no substantial growth-inducing effects would occur as a result of implementation of the ~~Proposed~~Scoping Plan.

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6.0 MANDATORY FINDINGS OF SIGNIFICANCE

Consistent with the requirements of the California Environmental Quality Act (CEQA) Guidelines section 15065 and section 18 of the Environmental Checklist, this Environmental Analysis (EA) addresses the mandatory findings of significance for the Proposed Strategy for Achieving California's 2030 Greenhouse Gas Target (~~Proposed~~Scoping Plan).

A. Mandatory Findings of Significance

1. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat for a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?

CEQA requires a finding of significance if a project "has the potential to substantially degrade the quality of the environment." (Cal. Code Regs., tit 14, § 15065, subd. (a).) In practice, this is the same standard as a significant impact on the environment, defined as "a substantial or potentially substantial adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance." (Cal. Code Regs., tit 14, § 15382.)

As with all environmental impacts and issue areas, the precise nature, location and magnitude of impacts would be highly variable, and would depend on a range of reasonably foreseeable compliance responses that could occur with implementation of the Proposed Strategy. Location, extent, and a variety of other site-specific factors are not known at this time but would be addressed by environmental reviews to be conducted by local or regional agencies with regulatory authority at the project-specific level.

This Final~~Draft~~ EA, in its entirety, addresses and discloses potential environmental impacts associated with the recommended actions with the proposed regulations, including direct, indirect, and cumulative impacts in the following resource areas:

Aesthetics
Agriculture and Forest Resources
Air Quality
Biological Resources
Cultural Resources
Energy Demand
Geology and Soils
Greenhouse Gases
Hazards and Hazardous Materials
Hydrology and Water Quality
Land Use and Planning
Mineral Resources
Noise
Population and Housing
Public Services
Recreation
Transportation/Traffic
Utilities and Service Systems

As described in Chapter 4, this Final~~Draft~~ EA discloses potential environmental impacts, the level of significance prior to mitigation, proposed mitigation measures, and the level of significance after the incorporation of mitigation measures.

a) Impacts on Species

CEQA requires a lead agency to find that a project may have a significant impact on the environment where there is substantial evidence that the project has the potential to (1) substantially reduce the habitat of a fish or wildlife species; (2) cause a fish or wildlife population to drop below self-sustaining levels; or (3) substantially reduce the number or restrict the range of an endangered, rare, or threatened species. (Cal. Code Regs., tit. 14, §15065, subd. (a)(1).) Chapter 4 of this Final~~Draft~~ EA addresses impacts that could occur to biological resources, including the reduction of fish or wildlife habitat, the reduction of fish or wildlife populations, and the reduction or restriction of the range of special-status species.

b) Impacts on Historical Resources

CEQA states that a lead agency shall find that a project may have a significant impact on the environment where there is substantial evidence that the project has the potential to eliminate important examples of a major period of California history or prehistory. (Cal. Code Regs., tit. 14, § 15065, subd. (a)(1).) This incorporates the requirement that major periods of California history are preserved for future generations and a finding of significance for substantial adverse changes to historical resources. (Pub. Resources Code §§ 21001, subd. (c), 21084.1.) CEQA establishes standards for determining the significance of impacts to historical resources and archaeological sites that are a historical resource. (Cal. Code Regs., tit. 14, § 15064.5.) Chapter 4 of this Final~~Draft~~ EA addresses impacts that could occur related to California history and prehistory, historic resources, archaeological resources, and paleontological resources.

2. Does the project have impacts that are individually limited, but cumulatively considerable?

CEQA Guidelines requires a lead agency shall find that a project may have a significant impact on the environment where there is substantial evidence that the project has potential environmental impacts that are individually limited, but cumulatively considerable. (Cal. Code Regs., tit. 14, § 15065.) Cumulatively considerable means "that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects." (Cal. Code Regs., tit. 14, § 15065, subd. (a)(3).) Cumulative impacts are addressed for each of the environmental topics listed above and are provided in Chapter 5, "Cumulative and Growth-Inducing Impacts," in this Final~~Draft~~ EA.

3. Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?

CEQA requires a lead agency to find that a project may have a significant impact on the environment where there is substantial evidence that the project has the potential to cause substantial adverse impacts on human beings, either directly or indirectly (Cal. Code Regs., tit. 14, § 15065, subd. (a)(4)). Under this standard, a change to the physical environment that might otherwise be minor must be treated as significant if people would be significantly affected. This factor relates to adverse changes to the environment of human beings generally, and not to impacts on certain individuals. While changes to the environment that could indirectly affect human beings would be represented by all the designated CEQA issue areas, those that could directly affect human beings include air quality, geology and soils, hazards and hazardous materials, hydrology and water quality, noise, population and housing, public services, transportation/traffic, and utilities, which are addressed in Chapter 4 of this Final~~Draft~~ EA.

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7.0 ALTERNATIVES ANALYSIS

This section provides an overview of the regulatory requirements and guidance for alternatives analyses under the California Environmental Quality Act (CEQA), a description of each of the alternatives to the Proposed Strategy for Achieving California's 2030 Greenhouse Gas Target (~~Proposed~~Scoping Plan), a discussion of whether and how each alternative meets the project's objectives, and an analysis of each alternative's environmental impacts.

A. Approach to Alternatives Analysis

The California Air Resources Board's (CARB or Board) certified regulatory program (Cal. Code Regs., tit. 17, §§ 60000 – 60008) requires that where a contemplated action may have a significant effect on the environment, a staff report shall be prepared in a manner consistent with the environmental protection purposes of CARB's certified regulatory program and with the goals and policies of CEQA. Among other things, the staff reports must address feasible alternatives to the proposed action that would substantially reduce any significant adverse impact identified.

The certified regulatory program provides general guidance that any action or proposal for which significant adverse environmental impacts have been identified during the review process shall not be approved or adopted as proposed if there are feasible mitigation measures or feasible alternatives available which would substantially reduce such adverse impact. For purposes of this section, "feasible" means capable of being accomplished in a successful manner within a reasonable period, considering economic, environmental, social, and technological factors, and consistent with the state board's legislatively mandated responsibilities and duties. (Cal. Code Regs., tit. 17, § 60006.)

While CARB, by virtue of its certified regulatory program, is exempt from Chapters 3 and 4 of CEQA and corresponding sections of the State CEQA Guidelines, the Guidelines nevertheless contain useful information for preparation of a thorough and meaningful alternatives analysis. CEQA Guidelines section 15126.6(a) speaks to evaluation of "a range of reasonable alternatives to the project, or the location of the project, which would feasibly attain most of the basic project objectives but would avoid or substantially lessen any of the significant effects, and evaluate the comparative merits of the alternatives." The purpose of the alternatives analysis is to determine whether or not different approaches to or variations of the project would reduce or eliminate significant project impacts, within the basic framework of the objectives, a principle that is consistent with CARB's certified regulatory program requirements. Alternatives considered in an environmental document should be potentially feasible and should attain most of the basic project objectives. It is, therefore, critical that the alternatives analysis define the project's objectives. The range of alternatives is governed by the "rule of reason," which requires evaluation of only those alternatives "necessary to permit a reasoned choice." (Cal. Code Regs., tit. 14, § 15126.6, subd. (f).) Further, an agency "need not consider an alternative whose effect cannot be reasonably

ascertained and whose implementation is remote and speculative." (Cal. Code Regs., tit. 14, § 15126.6, subd. (f)(3).) The analysis should focus on alternatives that are feasible and that take economic, environmental, social, and technological factors into account. Alternatives that are remote or speculative need not be discussed. Furthermore, the alternatives analyzed for a project should focus on reducing or avoiding significant environmental impacts associated with the project as proposed.

B. Selection of Range of Alternatives

This chapter evaluates a reasonable range of alternatives to the ~~Proposed~~Scoping Plan that have the potential to reduce or eliminate the project's significant effects on the environment, while meeting most of the basic project objectives. (Cal. Code Regs., tit. 14, § 15126.6, subd. (a).) Pursuant to CARB's certified regulatory program, this chapter also contains an analysis of each alternative's feasibility and the likelihood that it will substantially reduce any significant adverse environmental impacts identified in the impact analysis contained in Chapter 4 of this Final~~Draft~~ EA. (Cal. Code Regs., tit. 17, §§ 60005(b), 60006.) Importantly, the overall stringency of the alternatives that can fulfill the project's objectives is driven by the direction given to CARB to achieve the 2030 target. Alternatives that would not achieve this objective – for instance, those that require less stringent reductions – were therefore considered but rejected for further analysis. Accordingly, the alternatives chosen are aligned with those presented in the Scoping Plan document itself for consistency and comparison of analyses. These alternatives vary in their environmental impacts and ability to achieve the objective sufficiently to provide the public and decision makers a wide scope of action to consider.

As described earlier, the ~~Proposed~~Scoping Plan builds upon previous approaches used in both the initial Scoping Plan and the First Update to the Scoping Plan. The ~~Proposed~~Scoping Plan recommends a balanced mix of broad-based sector strategies and specific measures in each sector to ensure that California remains on track to meet both the near-term (2020) and the mid-term (2030) greenhouse gas (GHG) emissions limits, while continuing the downward GHG emissions trajectory consistent with achieving the State's long-term climate stabilization objectives for 2050; while maintaining a vibrant, clean, and sustainable California economy. Likewise, suitable alternatives considered in this Final~~Draft~~ EA need also to be broad-based, comprehensive approaches that could meet the basic project objectives, while reducing or eliminating the project's significant effects on the environment.

While the ~~Proposed~~Scoping Plan recognizes the need for broad-based strategies that require continued changes to how the State generates, transmits, and consumes electricity; how people and goods are transported; how communities are planned and built; the conveyance, distribution and consumption of water and other resources; and the State's management of its vast natural and agrarian lands; however, specific actions are not yet fully defined at this stage of planning. Accordingly, the alternatives considered here focus specifically on the measures identified in the Project Description above. These measures, too, are described at a programmatic level. The level of detail for each alternative must reflect that the project is a broad plan and, accordingly, the

analysis cannot provide the level of detail that will be contained in subsequent environmental review that would be conducted when each of the ~~Proposed~~Scoping Plan's recommended actions or regulations are subsequently developed and implemented by CARB or other lead agencies. (See Cal. Code Regs., tit. 14, §15168.)

CARB has identified a reasonable range of five alternatives that allow the public and Board to understand the differences between different approaches. GHG emission reduction measures ongoing or already implemented as part of the initial Scoping Plan are considered a part of the No-Project Alternative. Since these programs are already underway and reducing emissions at this time, they are reasonably expected to continue. In addition to the No Project Alternative, CARB made a good faith effort to identify other potentially feasible project alternatives. This included examining comments received at the public workshops held on October 1, 2015; January 15, 2016; March 23, 2016; April 27, 2016; August 23, 2016; September 14, 2016; November 7, 2016; and December 16, 2016, and at the Board hearings held on November 19, 2015; June 23, 2016 and November 17, 2016, as well as 11 EJAC and 11 Community meetings to determine if any commenters suggested potentially feasible alternatives. While commenters made suggestions for particular components of recommended actions within the key economic sectors, no comments suggested an alternative, broad-based comprehensive approach to the project itself. CARB staff found no comments suggesting an alternative comprehensive approach to meet the State's long-term goals.

Despite the challenge of identifying alternative approaches to the project as a whole, rather than just alternatives to components within the project, CARB staff was able to identify four feasible action alternatives, in addition to the No Project Alternative, a No Cap-and-Trade Alternative, Carbon Tax Alternative, All Cap-and-Trade Alternative and Cap-and-Tax Alternative. These are described more fully below. These alternatives to the project as a whole do not alter the basic nature of the project, while providing sufficient information to allow a comparison with the proposed project.

C. Project Objectives

The primary objectives of the ~~Proposed~~Scoping Plan are listed below. These objectives are primarily, derived from the requirements of SB 32 and AB 32 (Health & Saf. Code, § 38561), as well as other governing law, as well from statutory requirements applicable to the approval of AB 32 GHG emission reduction measures (Health & Saf. Code, § 38562). The analysis that follows in Section E of this chapter includes a discussion of the degree to which each alternative meets these basic project objectives:

1. To update the State's Scoping Plan for achieving the maximum technologically feasible and cost-effective reductions in GHG emissions to reflect the 2030 target (Executive Order B-30-15 and SB 32, Statutes of 2016);

2. Pursue measures that implement reduction strategies covering the State's GHG emissions in furtherance of executive and statutory direction to reduce GHG emissions to at least 40 percent below 1990 levels by 2030;

3. Increase electricity derived from renewable sources from one-third to 50 percent;

4. Double efficiency savings achieved at existing buildings and make heating fuels cleaner;

5. Reduce the release of methane and other short-lived climate pollutants;

6. Pursue emission reductions that are real, permanent, quantifiable, verifiable and enforceable;

7. Achieve the maximum technologically feasible and cost-effective reductions in GHG emissions, in furtherance of reaching the statewide GHG emissions limit (Health & Saf. Code, §38562, subd. (a) and (c));

8. Minimize, to the extent feasible, leakage of emissions outside of the State;

9. Ensure, to the extent feasible, that activities undertaken to comply with the measures do not disproportionately impact low-income communities (Health & Saf. Code, §38562, subd. (b)(2));

10. Ensure, to the extent feasible, that activities undertaken pursuant to the measures complement, and do not interfere with, efforts to achieve and maintain national and California Air Quality Attainment Standards (AAQS) and to reduce toxic air contaminant (TAC) emissions (Health & Saf. Code, §38562, subd. (b)(4));

11. Consider overall societal benefits, including reductions in other air pollutants, diversification of energy sources, and other benefits to the economy, environment, and public health (Health & Saf. Code, §38562, subd. (b)(6));

12. Minimize, to the extent feasible, the administrative burden of implementing and complying with the measure (Health & Saf. Code, §38562, subd. (b)(7));

13. Consider, to the extent feasible, the contribution of each source or category of sources to statewide emissions of GHGs (Health Saf. Code §38562, subd. (b)(9));

14. Maximize, to the extent feasible, additional environmental and economic benefits for California, as appropriate (Health & Saf. Code, §38570, subd. (b)(3)); and

15. Ensure that electricity and natural gas providers are not required to meet duplicative or inconsistent regulatory requirements (Health & Saf. Code, §§ 38501, subd. (g), 38561, subd. (a)).

D. Description of Alternatives

Descriptions of each alternative are presented below. Please reference the Scoping Plan document for a further description of Alternatives 2-5. Further, a carbon tax alternative was described in more detail the 2011 Final Supplement to the AB 32 Scoping Plan Functional Equivalent Document.

The analysis that follows the descriptions of the alternatives includes a discussion of the degree to which each alternative meets the basic project objectives, and the degree to which each alternative avoids potentially significant impacts identified in Chapter 4.

E. Evaluation of Scoping Plan Alternatives

During the development of the ~~Proposed~~Scoping Plan, stakeholders provided several suggestions for alternative scenarios to achieve the 2030 target. While there are numerous scenarios that could potentially be developed and evaluated, the five below were chosen for evaluation because they were most often included in comments by stakeholders and they represent a reasonable range of alternatives for consideration during review of the ~~proposed~~Scoping Plan.

1. Alternative 1: No-Project Alternative

a) Alternative 1 Description

CARB is including Alternative 1, the No-Project Alternative, to provide a good faith effort to disclose environmental information that is important for considering the ~~Proposed~~Scoping Plan. CARB's certified regulatory program does not mandate consideration of a "No-Project Alternative." (Cal. Code Regs., tit. 17, § 60006.) Under CARB's certified regulatory program, the alternatives considered, among other things, must be "consistent with the state board's legislatively mandated responsibilities and duties." (Cal. Code Regs., tit. 17, § 60006.)

~~Moreover, i~~It is not clear that it would be legally feasible for CARB to implement the No-Project Alternative, in the sense that the measures in the Scoping Plan are known commitments that may proceed independently of CARB's action on the Scoping Plan, per independent legal authority. Therefore, CARB has a statutory mandate to undertake some of the measures, making it legally infeasible for CARB to un-do some of the measures in the Scoping Plan. In April 2015, Governor Brown issued Executive Order B-30-15 to establish a California GHG reduction target of 40 percent below 1990 levels by 2030. In doing so, the Governor called on California to pursue a new and ambitious set of strategies, in line with the five climate change pillars from his inaugural address to reduce GHG emissions and prepare for the unavoidable impacts of climate change. In order to develop a clear plan of action to achieve the State's goals, the Executive Order

called on CARB to update the AB 32 Climate Change Scoping Plan to incorporate the 2030 target. In summer 2016, the Legislature affirmed the importance of addressing climate change through passage of Senate Bill (SB) 32 (Pavley, Chapter 249, Statutes of 2016), which codified into statute the 2030 GHG reduction target contained in the Executive Order B-30-15. In 2017, the legislature also enacted Assembly Bill 398 (AB 398, Chapter 135, Statutes of 2017), which clarifies the role of the Cap-and-Trade Program through 2030. AB 398 also identifies the Cap-and-Trade Program as the rule for petroleum refineries and oil and gas production facilities to achieve their greenhouse gas emissions reductions. ~~T~~Nevertheless, the update to the AB 32 Climate Change Scoping Plan to reflect the 2030 target (~~Proposed~~Scoping Plan) will serve as the framework to define the State's climate change priorities for the next 14 years and beyond.

Legal feasibility issues aside, the~~The~~ No-Project Alternative is included ~~only~~ to satisfy CEQA requirements, and to assist in the analysis and consideration of this portion of the ~~Proposed~~Scoping Plan and the action alternatives. It is useful to include a "No-Project Alternative" in this analysis for the same reasons that this type of alternative is called for in the State CEQA Guidelines. As noted in the CEQA Guidelines, "the purpose of describing and analyzing a no-project alternative is to allow decision-makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project." (Cal. Code Regs., tit. 14, § 15126.6, subd. (e)(1).) The No-Project Alternative also provides an important point of comparison to understand the potential environmental benefits and impacts of the other alternatives.
Alternative 1 in this analysis describes a reasonably foreseeable scenario, if CARB did not approve the ~~Proposed~~Scoping Plan. Under this No-Project Alternative, those measures included in both the initial Scoping Plan and the First Update to the Scoping Plan that are already being implemented, as well as those measures ~~enacted~~ implemented ~~under authority outside of AB 32~~ prior to the time environmental review for the Scoping Plan began, would continue to be implemented. Therefore, to foster public transparency, this alternative assumes the SLCP Reduction Strategy, the Post-2020 Cap-and-Trade Program and the measures identified under the Mobile Sources Strategy and Sustainable Freight Strategy have not been adopted, as those actions took place after environmental review began for the Scoping Plan.

The No-Project Alternative does not contemplate that there would be no further action by CARB or other state agencies related to the reduction of GHG emissions. Some of the recommended measures in the ~~Proposed~~Scoping Plan have occurred, and others may occur, as a result of requirements required by other statutes or because of commitments in existing plans or ones under development for other purposes (i.e., "known commitments" described in detail in the ~~Proposed~~Scoping Plan and summarized briefly in Chapter 2 of this Final~~Draft~~ EA), and subsequent regulatory actions by CARB or other agencies under separate statutory authority regardless of their inclusion in the ~~Proposed~~Scoping Plan.

b) Alternative 1 Discussion

i) Objectives

The No-Project Alternative would not meet many of the project objectives listed in Chapter 2 (and reiterated above). The No-Project Alternative would not ~~result in~~ ensure the maximum technologically feasible and cost-effective reductions in GHG emissions to achieve the 2030 target of 40 percent below 1990 levels (Objectives 1 and 2). This alternative would increase electricity derived from renewable sources, increase energy efficiency in existing buildings and make heating fuels cleaner, and reduce the release of methane and other short-lived climate pollutants; however, it is unknown if measures would be stringent enough to meet the goals associated with Objectives 3, 4, and 5. This Alternative would generally meet the remainder of objectives, as it would pursue emission reductions that are real, permanent, quantifiable, verifiable and enforceable (Objectives 6), and is consistent with other requirements set forth under the California Health and Safety Code (Objectives 7 and 9 through 15). To be consistent with AB 32, this alternative would minimize, to the extent feasible, leakage of emissions outside of the State (Objective 8).

ii) Environmental Impacts

The No-Project Alternative includes GHG emission reduction measures that are ongoing or already implemented as part of the initial Scoping Plan and 2014 Update, or developed under authorities additional to AB 32 (e.g., SB 350, the Clean Energy and Pollution Reduction Act of 2015 [Statues of 2015, De León]). Direct and indirect environmental impacts associated with implementation of these measures were analyzed in the 2008 Functional Equivalent Document (FED), 2011 FED Supplement, and 2014 Update EA. The No-Project Alternative, therefore, would still result in potential adverse environmental impacts that are similar to those described in Chapter 4 of the Final~~Draft~~ EA, but at a lesser magnitude because regulations would not be as stringent as proposed for the ~~Proposed~~Scoping Plan. These include potential impacts resulting from short-term construction and long-term operational impacts that may occur as a result of activities carried out in response to regulations or programs enacted to implement the recommended actions. The resource areas affected include aesthetics, agricultural resources, air quality, biological resources, cultural resources, geology and soils, hazardous materials, hydrology and water quality, noise, transportation/traffic, and utilities and service systems, as described in Chapter 4.

2. Alternative 2: No Cap-and-Trade Alternative

a) Alternative 2 Description

The Final EA retains the assessment of Alternative 2 as originally contemplated in the Draft EA. However, it is important to note that since the Draft EA was published, AB 398 was signed into law. AB 398 expressly requires CARB to use the Cap-and-Trade Program as the rule for petroleum refineries and oil and gas production facilities to

achieve their greenhouse gas emissions reductions, so Alternative 2 is no longer a legally feasible alternative with respect to those sectors. In addition, implementing Alternative 2 solely for the other sectors covered by the Cap-and-Trade Program – essentially by amending the Cap-and-Trade Regulation to remove those sectors from the Program – would be practically infeasible. Such a removal would fragment the existing, unified carbon market, thereby creating substantial financial and emissions uncertainty in an operating market. It would also greatly reduce the effectiveness of the Cap-and-Trade Program as it applies to the petroleum refineries and oil and gas production facilities by reducing the flexibility inherent in a more comprehensive, economy-wide Cap-and-Trade Program.

In response to AB 398, the Board approved amendments to the Cap-and-Trade Regulation on July 27, 2017, which established a framework for a post-2020 Cap-and-Trade Program, among other changes. CARB also included, as part of its approval, a recognition that additional regulatory amendments will be required through a new rulemaking process to implement the requirements of recently enacted AB 398 for the post-2020 Cap-and-Trade Program. Any future changes to the Cap-and-Trade Regulation will undergo the same rigorous and open process that includes technical, environmental, and economic analyses, and public review and input specific to that proposal.

Alternative 2 includes the known commitments described in Chapter 2 of this Final~~Draft~~ EA, plus the 30 percent reduction in GHG emissions in the refinery sector, but does not include a post-2020 Cap-and-Trade Program. To achieve climate goals, this alternative would rely on additional actions beyond the known commitments to ensure GHG emissions reductions are achieved to meet the 2030 target.

The enhancements to the known commitments and new policies and measures discussed below are illustrative of the additional types of action that would be needed in this alternative in the absence of a Cap-and-Trade Program, however, we have not attempted to identify ~~but they are not necessarily~~ the exact~~precise~~ suite of policies or measures that would be selected in the absence of a Cap-and-Trade Program. It is important to note that some of the specific polices and measures included for this scenario may have technology, cost, or legal authority barriers that may prevent implementation. The list below provides a summary of how a No Cap-and-Trade Alternative could be structured. Additional details about this alternative are included in the ~~Proposed~~Scoping Plan, Appendix D: Proposed Scoping Plan Scenario & Alternatives Modeling Description.

- Enhanced RPS, energy efficiency, LCFS, and refinery measure.
- New GHG prescriptive regulations for industry.
- A low-emission diesel standard.
- Additional deployment of ZEVs.
- Incentive programs for early retirement of vehicles and heating, ventilation, and air conditioning systems.
- Increased VMT reductions.

- Increased electrification of the residential sector.
- Increased utilization of renewable natural gas.

Implementation of Alternative 2, which, with the advent of AB 398, has been rendered infeasible, would result in many of the same reasonably foreseeable compliance responses discussed for the ~~Proposed~~Scoping Plan, related to energy and energy efficiency, including SB 350 measures, Low Carbon Fuel Standard (LCFS), State SIP Strategy measures, Short-Lived Climate Pollutant Strategy (SLCP) measures. In addition, this alternative would include establishment of an LED standard.

The LED standard would be flexible and enable multiple fuel types to meet the standard. LED fuels would be subject to the Low Carbon Fuel Standard (LCFS), which requires life cycle analysis, as well as less than one percent aromatics, virtually no sulfur, and a blendstock carbon intensity (CI) maximum of 30-60 grams of carbon dioxide equivalent per megajoule (gCO2e/MJ). This standard is anticipated to increase consumption of LED fuels, including renewable hydrocarbon diesel (more commonly known as renewable diesel) from such feedstocks as oil seeds and tallow; and/or compressed or liquefied renewable LED fuels from gas to liquid processing of biomethane or forest residues. Renewable hydrocarbon diesel is currently anticipated to be the most likely fuel to meet the LED requirements.

b) Alternative 2 Discussion

i) Objectives

It is unclear if Alternative 2 would meet 2030 GHG emission reduction targets (Objectives 1 and 2). To achieve the 2030 GHG emissions reduction target without the Cap-and-Trade Program, significant additional actions beyond the known commitments would have to be put in place, many of which may currently face implementation, technology, and cost barriers that must be overcome to ensure the target can be achieved. If any measures are unable to be implemented or fail to perform, as needed, new measures would need to be identified, designed, and implemented. The time required to design and implement new measures could impede the State's ability to achieve its 2030 GHG target. Under Alternative 2, the Scoping Plan would exceed objectives related to 50 percent renewable and the doubling of energy efficiency at existing buildings (Objective 3). This alternative would increase energy efficiency in existing buildings and make heating fuels cleaner, and reduce the release of methane, black carbon, and other short-lived climate pollutants; however, it is unknown if measures would be stringent enough to meet the goals associated with Objectives 4 and 5. This Alternative would generally meet the remainder of the project objectives, as it would pursue emission reductions that are real, permanent, quantifiable, verifiable and enforceable (Objectives 6), and is consistent with other requirements set forth under the California Health and Safety Code (Objectives 7 and 9 through 15). To be consistent with AB 32, this alternative would minimize, to the extent feasible, leakage of emissions outside of the State (Objective 8).

ii) Environmental Impacts

Under Alternative 2, there would be more individual construction projects than described for the ~~Proposed~~Scoping Plan. This would result a greater magnitude to impacts such as aesthetic resources, geology and soils, biological resources, and cultural resources compared to the ~~proposed~~Scoping Plan. For instance, an increased demand on batteries would contribute to a greater demand on lithium, thereby increasing impacts mineral resources impacts; there would need to be more renewable energy projects, and greater cultivation of feedstock for low carbon fuels and LED fuels. Without a Cap-and-Trade Program, there would be less impacts associated with construction of new facilities and modifications to existing facilities for covered entities and less impacts related to development and implementation of project under the offset protocols. However, the increase in projects related to other regulations (e.g., LCFS, RPS) would likely require greater earth-moving activities, and thus environmental effects, than any reduction in the number of projects associated with removal of Cap-and-Trade as a recommended program. This is assumed because the covered entity compliance responses and offset protocol projects occur within existing facilities (e.g., industrial facilities, rice farms, landfills [Ontario only], and mines), whereas other recommended actions would require projects such as renewable energy facilities that would be located within existing undisturbed lands. In addition, increasing the supply of RNG could require additional processing facilities, pipelines, and modifications to landfills, dairies, wastewater treatment plants and other renewable gas supplies.

3. Alternative 3: Carbon Tax Alternative

a) Alternative 3 Description

The Final EA retains the assessment of Alternative 3 as originally contemplated in the Draft EA. Alternative 3 includes the known commitments described in Chapter 2 of this Final~~Draft~~ EA~~, the 20 percent reduction in GHG emissions at refineries,~~ and a carbon tax in lieu of a post-2020 Cap-and-Trade Program. However, as indicated above for Alternative 2, it is important to note that since the Draft EA was published, AB 398 was signed into law. AB 398 expressly requires CARB to use the Cap-and-Trade Program as the rule for petroleum refineries and oil and gas production facilities to achieve their greenhouse gas emissions reductions, so Alternative 3 is no longer a legally feasible alternative with respect to those sectors. In addition, implementing Alternative 3 solely for the other sectors covered by the Cap-and-Trade Program – essentially by amending the Cap-and-Trade Regulation to remove those sectors from the Program and developing a carbon tax on those sectors – would be practically infeasible. Such a removal would fragment the existing, unified carbon market, thereby creating substantial financial and emissions uncertainty in an operating market. It would also greatly reduce the effectiveness of the Cap-and-Trade Program as it applies to the petroleum refineries and oil and gas production facilities by reducing the flexibility inherent in a more comprehensive, economy-wide Cap-and-Trade Program.

Cap-and-trade and a carbon tax are both pricing mechanisms, but there is an important difference. A cap-and-trade program has an emission limit so that the maximum allowable GHG emission level is known and covered entities are mandated to reduce GHG emissions. With a carbon tax, there is no mechanism to limit the actual amount of GHG emissions either at a single source or in the aggregate. That is, cap-and-trade provides environmental certainty while a carbon tax provides some price certainty.

b) Alternative 3 Discussion

i. Objectives

A set carbon tax may not represent the actual cost of control for the covered sectors. If the price is set too high, the program would be unnecessarily expensive, which could result in leakage; and, if the is set price too low, GHG reduction targets may not be met as taxed entities find it feasible to simply incur the cost of emissions. This alternative provides compliance flexibility, because it does not mandate specific actions and it provides a funding source that could be used to fund GGRF programs, or other programs. This alternative could provide air-quality benefits, public health benefits, and direct emission reductions if the carbon tax is set appropriately to reduce GHGs.

Thus, it is unclear if Alternative 3 would meet 2030 GHG emission reduction targets, because it would depend on market conditions and unforeseeable actions taken by covered entities. However, notably, British Columbia's carbon tax program has failed to meet GHG emission reduction goals, which may indicate that the 2030 target would not likely be met (Objectives 1 and 2). Under the Alternative 3, the Scoping Plan would meet the objective related to 50 percent renewable electricity sources, and the doubling of energy efficiency at existing buildings based on implementation of the known commitments, excluding a post 2020 Cap-and-Trade Program (Objective 4 and 5). This alternative would increase energy efficiency in existing buildings and make heating fuels cleaner, and reduce the release of methane, and other short-lived climate pollutants as a result on implementation of SLCP and renewable energy and energy efficiency, including SB 350 measures (Objective 4 and 5). This Alternative would generally meet the remainder of alternatives, as it would pursue emission reductions that are real, permanent, quantifiable, verifiable and enforceable (Objectives 6), and is consistent with other requirements set forth under the California Health and Safety Code (Objectives 7 and 9 through 15). Under this alternative, there is no known, reliable way to address trade exposure and to protect against emissions leakage, as required under AB 32. One potential strategy to prohibit emissions leakage may be to exempt trade-exposed sectors from the carbon tax, but that would shift the burden to the sectors still subject to the tax and would pick "winners" across sectors as some industries may face a carbon cost and others may not. Any such exemptions would need to consider the role any exempt sector is expected to play in the long term, because supporting carbon-intensive or fossil fuel industry sectors may not align well with the State's long-term climate goals. Thus, it is unclear if leakage can be feasibly avoided under Alternative 3 (Objective 8).

ii. Environmental Impacts

Under Alternative 3, there would be no emission reduction requirements specified by a cap, except for petroleum refineries and oil and gas production facilities, but similar emission reductions would be achieved based on market responses to the carbon tax, and through direct regulation. There would be no allowance trading, although there could be trading in tax credits. Under this alternative, impacts would be related to actions by covered entities taken in response to the regulation-set price of carbon emissions through upgrading equipment, switching to lower intensity carbon fuels, and implementing maintenance and process changes at existing facilities. The impacts associated with these actions could be more widespread, and of greater magnitude than under the ~~Proposed~~Scoping Plan depending on the size and location of individual actions (i.e., impacts to biological resources, cultural resources, geology, soils, and minerals, hydrology and water quality, land use, and transportation and traffic), for covered entities that aim to make investments that would reduce long-term carbon costs. Alternatively, covered entities may opt to budget for greater carbon tax costs, which would ultimately reduce several adverse environmental effects compared to the ~~Proposed~~Scoping Plan, because fewer projects would be implemented to upgrade equipment, switch to lower intensity carbon fuels, and implement maintenance and process changes at existing facilities. It is unknown, and cannot feasibly be determined, if these reduced impacts would counteract potential increased environmental effects related to activities taken by covered entities in response to the cost of carbon emissions being incurred. The potential for these changes and their potential environmental effects would be related to economic and other business-related conditions, determined by individual facilities subject to GHG reduction regulations.

4. Alternative 4: All Cap-and-Trade

a) Alternative 4 Description

Alternative 4 is a variant of the ~~Proposed~~Scoping Plan, which would rely more heavily on the Cap-and-Trade Program. This alternative ~~does not include the 20 percent refinery sector measure and~~ maintains the LCFS stringency at a 10 percent reduction in CI through 2030 (i.e., no increase in stringency above the current standard).

Implementation of this alternative would generally result in the same types of reasonably foreseeable compliance responses described for the ~~Proposed~~Scoping Plan, in Chapter 2 of this Final~~Draft~~ EA. However, ~~there would be fewer modifications required to existing refineries, and~~ there would be no new actions related to implementation of LCFS.

b) Alternative 4 Discussion

i. Objectives

It is likely that Alternative 4 would meet 2030 GHG emission reduction targets, because a cap would require GHG emission targets to be met (Objectives 1 and 2). Under the

Alternative 4, renewable energy and energy efficiency, including SB 350 measures would be implemented, thus, the objectives related to 50 percent renewable and the doubling of energy efficiency at existing buildings would be met (Objectives 3 and 4). This alternative would increase energy efficiency in existing buildings and make heating fuels cleaner, and reduce the release of methane and other short-lived climate pollutants (Objective 5). This Alternative would generally meet the remainder of objectives, as it would pursue emission reductions that are real, permanent, quantifiable, verifiable and enforceable (Objectives 6), and is consistent with other requirements set forth under the California Health and Safety Code (Objectives 7 and 9 through 15). By strengthening the Cap-and-Trade Program, markets could be adjusted to minimize to the extent feasible, leakage of emissions outside of the State (Objective 8).

ii. Environmental Impacts

Compared to the ~~Proposed~~Scoping Plan, there would be similar impacts associated with SLCP, energy and energy efficiency, including SB 350 measures, SB 375, and the State SIP Strategy measures. Because Cap-and-Trade would be more stringent, there would be a greater magnitude of construction-related impacts (e.g., aesthetics, agricultural and forest resources, biological resources impacts) and impacts related to offset protocols. However, there would be no impacts related to the LCFS regulation, such as those related to changes in land use (biological resources, agricultural and forest resources, geology and soil resources, hydrology and water quality, and traffic and transportation). It is unknown, and cannot feasibly be determined, whether these reduced impacts would counteract potential increased environmental effects related to activities taken by covered entities in response to the cost of carbon emissions being incurred. The potential for these changes and their potential environmental effects would be related to economic and other business-related conditions, determined by individual facilities subject to GHG reduction regulations.

5. Alternative 5: Cap-and-Tax

a) Alternative 5 Description

The Final EA retains the assessment of Alternative 5 as originally contemplated in the Draft EA. Alternative 5 is a variant of Alternative 3 (Carbon Tax) with some features from the ~~Proposed~~Scoping Plan. This alternative is designed to cap GHG emissions and incorporate pricing through a tax. This alternative is structured to be the same as Alternative 3 with known commitments ~~and a 20 percent refinery sector measure~~. Under this alternative, entities that would be covered by a post-2020 Cap-and-Trade Program would instead have an annual cap with a GHG emissions decline of no more than 4.5 percent each year from 2021 to 2030 for each covered entity. Each year, these entities would be required to reduce their emissions by the established annual cap decline and pay for each metric ton of GHGs they emit that year. There would be no trading mechanism, and no exemptions or offsets under this alternative.

As indicated above for Alternatives 2 and 3, it is important to note that since the Draft EA was published, AB 398 was signed into law. AB 398 expressly requires CARB to use the Cap-and-Trade Program as the rule for petroleum refineries and oil and gas production facilities to achieve their greenhouse gas emissions reductions, so Alternative 5 is no longer a legally feasible alternative with respect to those sectors. In addition, implementing Alternative 5 solely for the other sectors covered by the Cap-and-Trade Program – essentially by amending the Cap-and-Trade Regulation to remove those sectors from the Program and placing them under an annual cap-and-tax program – would be practically infeasible. Such a removal would fragment the existing, unified carbon market, thereby creating substantial financial and emissions uncertainty in an operating market. It would also greatly reduce the effectiveness of the Cap-and-Trade Program as it applies to the petroleum refineries and oil and gas production facilities by reducing the flexibility inherent in a more comprehensive, economy-wide Cap-and-Trade Program.

b) Alternative 5 Discussion

i. Objectives

If this mechanism were feasible, it~~This mechanism~~ would be expected to deliver 191 $MMTCO2_e$ amount of cumulative GHG emission reductions. As the caps would be based on some fixed baseline amount for each entity, if other measures did not perform as expected, this alternative may not achieve the 2030 target as it would not scale across the industrial and energy sectors like the a cap-and-trade program (Objectives 1 and 2). Under the Alternative 5, renewable energy and energy efficiency, including SB 350 measures would be implemented, thus, the objectives related to 50 percent renewable and the doubling of energy efficiency at existing buildings would be met (Objectives 3 and 4). This alternative would reduce the release of methane and other short-lived climate pollutants (Objectives 5). This Alternative would generally meet the remainder of objectives, as it would pursue emission reductions that are real, permanent, quantifiable, verifiable and enforceable (Objectives 6), and is consistent with other requirements set forth under the California Health and Safety Code (Objectives 7 and 9 through 15). Under Alternative 5 there are limited mechanisms to address emissions leakage, which may increase under this scenario as each covered entity would need to take action at some cost each year to reduce its emissions per the cap and still be subject to a carbon tax for its actual emissions (Objective 8).

ii. Environmental Impacts

Under Alternative 5, there would be no allowance trading, and covered entities would be required to pay a tax or make modification to facilities to meet caps. Under this alternative, impacts would be related to actions by covered entities taken in response to the regulation-set price of carbon emissions through upgrading equipment, switching to lower intensity carbon fuels, and implementing maintenance and process changes at existing facilities. The impacts associated with these actions could be more widespread, and of greater magnitude than under the ~~Proposed~~Scoping Plan depending on the size and location of individual actions (i.e., impacts to biological resources, cultural resources, geology, soils, and minerals, hydrology and water quality, land use, and

transportation and traffic), for covered entities that aim to make investments that would reduce long-term carbon costs. Alternatively, covered entities may opt to budget for greater carbon tax costs, which would ultimately reduce several adverse environmental effects compared to the ~~Proposed~~Scoping Plan, because fewer projects would be implemented to upgrade equipment, switch to lower intensity carbon fuels, and implement maintenance and process changes at existing facilities. It is unknown, and cannot feasibly be determined, if these reduced impacts would counteract potential increased environmental effects related to activities taken by covered entities in response to the cost of carbon emissions being incurred. The potential for these changes and their potential environmental effects would be related to economic and other business-related conditions, determined by individual facilities subject to GHG reduction regulations.

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ATTACHMENT A: ENVIRONMENTAL AND REGULATORY SETTING

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This chapter contains the environmental and regulatory setting for the U.S., Canada, and the State of California. A summary of the environmental setting is provided first, followed by the regulatory setting in the U.S. and the State of California (Tables A2-1 – A2-18). Regulations pertaining to Canada are described separately in Section B, below.

ENVIRONMENTAL SETTING

A. Aesthetics

1. United States and Canada

The U.S. and Canada, by virtue of their size, setting, and topographic and climatic variation, exhibit tremendous scenic diversity. The varied landscape ranges from coastal to desert and valley to mountain. Innumerable natural features and settings combine to produce scenic resources that are treasured by residents and visitors alike.

2. California

The visual character of California varies greatly related to topography and climate. The foothills form a transitional landform from the valley floor to the higher Sierra Nevada, Cascade, and Coast Ranges. The valley floor is cut by two rivers that flow west out of the Sierra Nevada and east out of the Coast Ranges. Irrigated agriculture land is the primary landscape in the Sacramento and San Joaquin valleys, and the foothill landscape has been altered by grazing, mining, reservoir development, and residential and commercial development. The visual character of the state also varies dramatically from the north, which is dominated by forest lands, and the south, which is primarily residential and commercial development.

B. Agriculture and Forest Resources

1. United States

Forests in the U.S. are very diverse in composition and distribution, including oak-hickory and maple-beech-birch forests, as well as fir, pine, and redwood forests. It is estimated that, at the beginning of European settlement (circa 1630), the area of forest land in the current boundaries of the U.S. was approximately 423 million hectares, or about 46 percent of the total land area. By 1907, the area of forest land had declined to an estimated 307 million hectares or 34 percent of the total land area. Forest area has been relatively stable since 1907. In 1997, 302 million hectares or 33 percent of the total land area of the U.S. was in forest land. As of 2000, forest land area amount to approximately 70 percent of the area that was forested in 1630. Since 1630, approximately 120 million hectares of forest land have been converted to other uses, primarily agriculture (USFS 2000).

U.S. land area amounts to nearly 2.3 billion acres, with nearly 1.2 billion acres in agricultural lands. The proportion of the land base in agricultural uses declined from 63 percent in 1949 to 51 percent in 2007, the latest year for which data are available.

Gradual declines have occurred in cropland and pasture/range, while grazed forestland has decreased more rapidly. In 2007, 408 million acres of agricultural land were in cropland (-17 percent from 1949), 614 million acres were in pasture and range (-3 percent), 127 million acres were in grazed forestland (-52 percent), and 12 million acres were in farmsteads and farm roads (-19 percent) (USDA 2016).

2. California

The State of California maps and classifies farmland through the California Department of Conservation Farmland Mapping and Monitoring Program (FMMP). Classifications are based on a combination of physical and chemical characteristics of the soil and climate that determine the degree of suitability of the land for crop production. The classifications under the FMMP are as follows:

- Prime Farmland—land that has the best combination of features for the production of agricultural crops;
- Farmland of Statewide Importance—land other than Prime Farmland that has a good combination of physical and chemical features for the production of agricultural crops, but that has more limitations than Prime Farmland, such as greater slopes or less ability to store soil moisture;
- Unique Farmland—land of lesser quality soils used for the production of the state's leading agricultural cash crops;
- Farmland of Local Importance—land of importance to the local agricultural economy;
- Grazing Land—existing vegetation that is suitable for grazing;
- Urban and Built-Up Land—land occupied by structures in density of at least one dwelling unit per 1.5 acres;
- Land Committed to Nonagricultural Use—vacant areas; existing land that has a permanent commitment to development but has an existing land use of agricultural or grazing lands; and
- Other Land— land not included in any other mapping category, common examples of which include low-density rural developments, brush, timber, wetland, and vacant and nonagricultural land surrounded on all sides by urban development.

California Environmental Quality Act (CEQA) Section 21095 and CEQA Guidelines Appendix G, together, define Prime, Unique, and Farmland of Statewide Importance as "Important Farmland," whose conversion may be considered significant. Local jurisdictions can further consider other classifications of farmland as important, and can

also utilize an agricultural land evaluation and site assessment (LESA) model to determine farmland importance and impacts from conversion.

As of 2012, California contained approximately 5 million acres of Prime Farmland; approximately 2.6 million acres of Farmland of Statewide Important; approximately 1.3 million acres of Unique Farmland; approximately 3.2 million acres of Farmland of Local Importance; and approximately 19.2 million acres of grazing land (FMMP 2015).

a) Williamson Act

The California Land Conservation Act of 1965--commonly referred to as the Williamson Act--enables local governments to enter into contracts with private landowners for the purpose of restricting specific parcels of land to agricultural or related open space use. In return, landowners receive property tax assessments which are much lower than normal because they are based upon farming and open space uses as opposed to full market value. The Open Space Subvention Act of 1971 provided local governments an annual subvention of forgone property tax revenues from the state through the year 2009; these payments have been suspended in more recent years due to revenue shortfalls.

Of California's 58 counties, 52 have executed contracts under the Land Conservation Act Program. The 15.4 million acres reported as enrolled in Land Conservation Act contracts statewide in 2013, represents approximately 50 percent of California's farmland total of about 30 million acres, or about 31 percent of the State's privately owned land (California Department of Conservation [DOC] 2015).

b) Forestry Resources

Forestland is defined as land that can support 10 percent native tree cover of any species, including hardwoods, under natural conditions, and that allows for management of one or more forest resources, including timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, and other public benefits (Public Resources Code [PRC] 12220[g]). There are 40,233,000 acres of forested land within California including oak woodlands and conifer forests (California Department of Fish and Wildlife [CDFW] 2014).

Timberland is privately-owned land, or land acquired for state forest purposes, which is devoted to and used for growing and harvesting timber, or for growing and harvesting timber and compatible uses, of, at minimum 15 cubic feet per acre (PRC 51104[g]). Forest managed for harvest is called timberland, and includes 2,932,000 acres in private ownership, 146,000 acres in State ownership, 10,130,000 acres in federal ownership, and 4,551,000 acres of non-industrial timberland in private ownership (CDFW 2014).

3. Canada

Canada has 348 million hectares (ha) of forest land. This represents 9 percent of the world's forests and 24 percent of the world's boreal forests. Forests dominate the Canadian landscape almost everywhere except the Arctic and the Prairies. The provinces and territories monitor regeneration and wood volume growth in the commercial forest areas they manage, collaborating with the federal government in this

and many other aspects of sustainable forest management (Natural Resources Canada [NRCAN] 2016a).

In the 2011 Census of Agriculture, more than 85,000 livestock farms were reported, representing 41.6 percent of all farms in Canada. In 2010, livestock farms reported total gross receipts of $24.4 billion and incurred $21.0 billion in operating expenses (Statistics Canada [StatCan] 2016).

C. Air Quality

1. United States

At the federal level, U.S. Environmental Protection Agency (EPA) has oversight of State programs. In addition, U.S. EPA established emission standards for mobile sources such as ships, trains, and airplanes. The U.S. EPA has set National Ambient Air Quality Standards (NAAQS) for six principal pollutants, which are called criteria air pollutants. Periodically, the standards are reviewed and may be revised. The current standards are listed below in Table A1-1. Units of measure for the standards are parts per million (ppm) by volume, parts per billion (ppb) by volume, and micrograms per cubic meter of air ($\mu g/m^3$).

2. California

The California Air Resources Board (CARB) is California's lead air agency and controls emissions from mobile sources, fuels, and consumer products, as well as air toxics. CARB also coordinates local and regional emission reduction measures and plans that meet federal and State air quality limits. At the federal level, the U.S. EPA has oversight of State programs. In addition, U.S. EPA alone has jurisdiction to establish emission standards for certain mobile sources such as ships, trains, and airplanes.

a) Criteria Air Pollutants

Concentrations of emissions of criteria air pollutants (CAPs) are used to indicate the quality of the ambient air because these are the most prevalent air pollutants known to be deleterious to human health. A brief description of each CAP is provided below. Emission source types and health effects are summarized in Table A1-1.

Table A1-1: Sources and Health Effects of Criteria Air Pollutants

Pollutant	Sources	Acute[1] Health Effects	Chronic[2] Health Effects
Ozone	Secondary pollutant resulting from reaction of reactive organic gases (ROG) and oxides of nitrogen (NO_X) in presence of sunlight. ROG emissions result from incomplete combustion and evaporation of chemical	Increased respiration and pulmonary resistance; cough, pain, shortness of breath, lung inflammation	Permeability of respiratory epithelia, possibility of permanent lung impairment

Table A1-1: Sources and Health Effects of Criteria Air Pollutants

Pollutant	Sources	Acute[1] Health Effects	Chronic[2] Health Effects
	solvents and fuels; NO_X results from the combustion of fuels		
Carbon monoxide (CO)	Incomplete combustion of fuels; motor vehicle exhaust	Headache, dizziness, fatigue, nausea, vomiting, death	Permanent heart and brain damage
Nitrogen dioxide (NO_2)	Combustion devices; e.g., boilers, gas turbines, and mobile and stationary reciprocating internal combustion engines	Coughing, difficulty breathing, vomiting, headache, eye irritation, chemical pneumonitis or pulmonary edema; breathing abnormalities, cough, cyanosis, chest pain, rapid heartbeat, death	Chronic bronchitis, decreased lung function
Sulfur dioxide (SO_2)	Coal and oil combustion, steel mills, refineries, and pulp and paper mills	Irritation of upper respiratory tract, increased asthma symptoms	Insufficient evidence linking SO_2 exposure to chronic health impacts
Respirable particulate matter (PM_{10}) and fine particulate matter ($PM_{2.5}$)	Fugitive dust, soot, smoke, mobile and stationary sources, construction, fires and natural windblown dust, and formation in The atmosphere by condensation and/or transformation of SO_2 and ROG	Breathing and respiratory symptoms, aggravation of existing respiratory and cardiovascular diseases, premature death	Alterations to the immune system, carcinogenesis
Lead	Metal processing	Reproductive/ developmental effects (fetuses and children)	Numerous effects including neurological, endocrine, and cardiovascular effects

[1] Acute refers to effects of short-term exposures to CAPs usually at relatively high concentrations.

[2] Chronic refers to effects of long-term exposures to CAPs, even at relatively low concentrations.

Sources: U.S. EPA 2016

b) Ozone

Ozone is a photochemical oxidant (a substance whose oxygen combines chemically with another substance in the presence of sunlight) and the primary component of smog. Ozone is not directly emitted into the air but is formed through complex chemical

reactions between precursor emissions of reactive organic gases (ROG) and oxides of nitrogen (NO_X) in the presence of sunlight. ROG are volatile organic compounds that are photochemically reactive. ROG emissions result primarily from incomplete combustion and the evaporation of chemical solvents and fuels. NO_X are a group of gaseous compounds of nitrogen and oxygen that result from the combustion of fuels.

Anthropogenic emissions of the ozone precursors ROG and NO_X have decreased over the past several years because of more stringent motor vehicle standards and cleaner burning fuels. During the last 20 years the maximum amount of ROG and NO_X over an 8-hour period decreased by 17 percent. However, most counties in California are still in nonattainment for ozone.

c) Nitrogen Dioxide

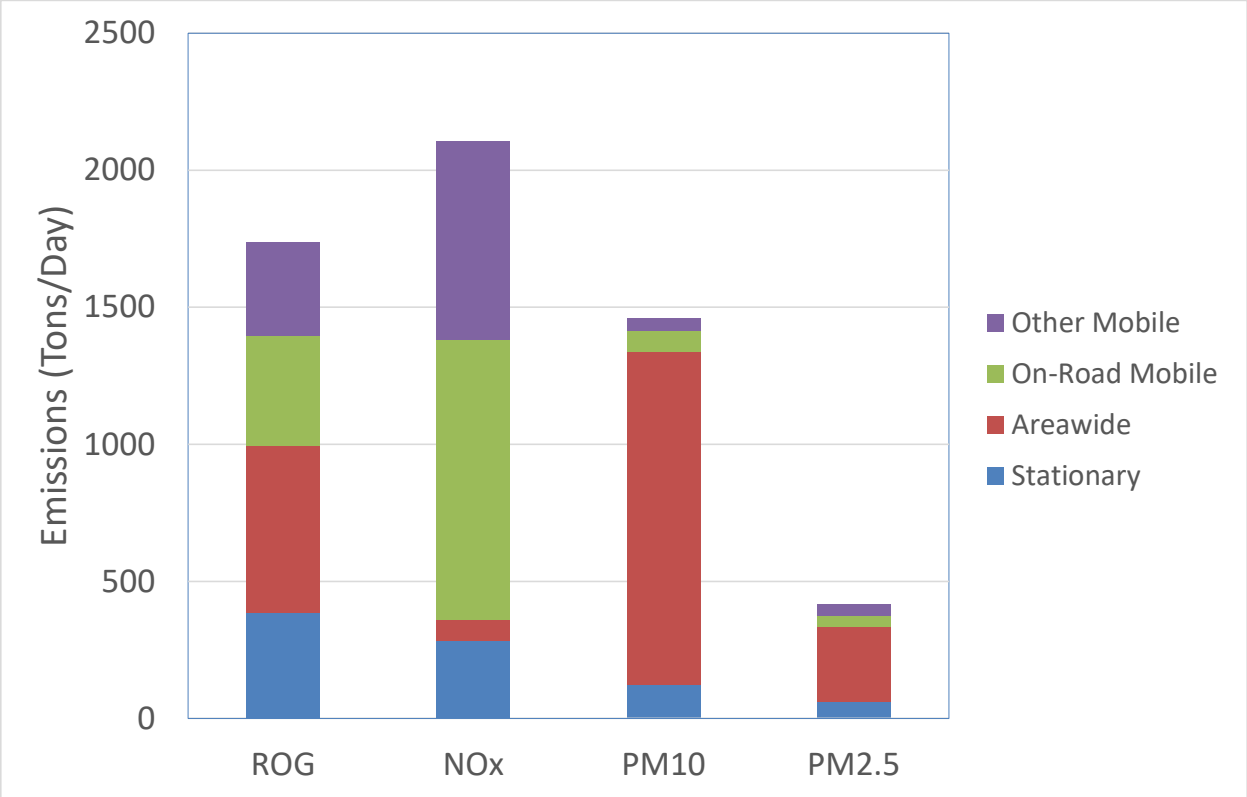
NO_2 is a brownish, highly-reactive gas that is present in all urban environments. The major human-made sources of NO_2 are combustion devices, such as boilers, gas turbines, and mobile and stationary reciprocating internal combustion engines. Combustion devices emit primarily nitric oxide (NO), which reacts through oxidation in the atmosphere to form NO_2. The combined emissions of NO and NO_2 are referred to as NO_X and are reported as equivalent NO_2. Because NO_2 is formed and depleted by reactions associated with photochemical smog (ozone), the NO_2 concentration in a particular geographical area may not be representative of the local sources of NO_X emissions (U.S. EPA 2016).

d) Particulate Matter

Respirable particulate matter with an aerodynamic diameter of 10 micrometers or less is referred to as PM_{10}. PM_{10} consists of particulate matter emitted directly into the air, such as fugitive dust, soot, and smoke from mobile and stationary sources, construction equipment, fires and natural windblown dust, and particulate matter formed in the atmosphere by reaction of gaseous precursors (CARB 2009). $PM_{2.5}$ includes a subgroup of smaller particles that have an aerodynamic diameter of 2.5 micrometers or less. PM_{10} emissions in California are dominated by emissions from area sources, primarily fugitive dust from vehicle travel on unpaved and paved roads, farming operations, construction and demolition, and particles from residential fuel combustion. Direct emissions of PM_{10} have increased slightly in California over the last 20 years, and are projected to continue to increase. $PM_{2.5}$ emissions have remained relatively steady over the last 20 years and are projected to increase slightly through 2020. Emissions of $PM_{2.5}$ are dominated by the same sources as emissions of PM_{10} (CARB 2009).

e) Emission Inventory

Exhibit 1 summarizes emissions of CAPs within California for various source categories. According to California's emission inventory, mobile sources are the largest contributor to the estimated annual average for air pollutant levels of ROG and NO_X accounting for approximately 43 percent and 83 percent, respectively, of the total emissions. Area wide sources account for approximately 83 percent and 65 percent of California's PM_{10} and $PM_{2.5}$ emissions, respectively (CARB 2013).



Source: CARB 2013
Exhibit 1 California 2012 Emission Inventory

f) Toxic Air Contaminants

Concentrations of toxic air contaminants (TACs) are also used to indicate the quality of ambient air. A TAC is defined as an air pollutant that may cause or contribute to an increase in mortality or in serious illness, or that may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air; however, their high toxicity or health risk may pose a threat to public health even at low concentrations.

According to the *California Almanac of Emissions and Air Quality* (CARB 2009), the majority of the estimated health risks from TACs can be attributed to relatively few compounds, the most predominant being particulate-exhaust emissions from diesel-fueled engines (diesel PM). Diesel PM differs from other TACs in that it is not a single substance, but rather a complex mixture of hundreds of substances. Although diesel PM is emitted by diesel-fueled internal combustion engines, the composition of the emissions varies depending on engine type, operating conditions, fuel composition, lubricating oil, and whether an emissions control system is being used. Unlike some TACs, no ambient monitoring data are available for diesel PM because no routine measurement method currently exists. However, CARB has made preliminary concentration estimates based on a PM exposure method. This method uses the CARB emissions inventory's PM_{10} database, ambient PM_{10} monitoring data, and the results from several studies to estimate concentrations of diesel PM. In addition to diesel PM, the TACs for which data are available that pose the greatest existing ambient risk in

California are benzene, 1,3-butadiene, acetaldehyde, carbon tetrachloride, hexavalent chromium, paradichlorobenzene, formaldehyde, methylene chloride, and perchloroethylene.

Diesel PM poses the greatest health risk among these 10 TACs mentioned. Since 1990, the health risk associated with diesel PM has been in California has reduced by 52 percent. Overall, levels of most TACs, except paradichlorobenzene and formaldehyde, have decreased since 1990 (CARB 2009: Chapter 5).

3. Canada

Canadian Ambient Air Quality Standards are health-based air quality objectives for pollutant concentrations in outdoor air. Under the Air Quality Management System, Environment Canada and Health Canada established air quality standards for fine particulate matter and ground-level ozone, two pollutants of concern to human health and the major components of smog. While the Canadian Ambient Air Quality Standards (CAAQS) for fine particulate matter and ozone are set at lower (more stringent) levels than NAAQS in the U.S., direct comparisons are difficult as both countries have significantly different air quality, legislative and regulatory frameworks. The U.S. has approximately 10 times the population in less geographic space, with corresponding pressures on air quality. Additionally, under the American *Clean Air Act*, penalties can be levied on states where the NAAQS are not being met. Under the *Canadian Environmental Protection Act, 1999,* the CAAQS are voluntary objectives.

D. Biological Resources

1. United States

The U.S. is comprised of many different biological provinces, or biomes, including tundras, coniferous forests, deciduous forests, rain forests, grasslands, and deserts. Each biome provides a sanctuary to a diverse variety of biological species. The U.S. Fish and Wildlife Service (USFWS) has listed over 400 animal and 700 plant species as endangered, and approximately 360 species as threatened (USFWS 2016).

2. California

The state's geography and topography have created distinct local climates ranging from high rainfall in northwestern mountains to the driest place in North America, Death Valley. North to south, the state extends for almost 800 miles, bridging the temperate rainforests in the Pacific Northwest and the subtropical arid deserts of Mexico. Many parts of the state experience Mediterranean weather patterns, with cool, wet winters and hot, dry summers. Summer rain is indicative of the eastern mountains and deserts, driven by the western margin of the North American monsoon. Along the northern coast abundant precipitation and ocean air produces foggy, moist conditions. High mountains have cooler conditions, with a deep winter snow pack in normal climate years. Desert conditions exist in the rain shadow of the mountain ranges (CDFW 2015).

While the state is largely considered to have a Mediterranean climate, it can be further subdivided into six major climate types: Desert, Marine, Cool Interior, Highland, Steppe, and Mediterranean. California deserts, such as the Mojave, are typified by a wide range of elevation with more rain and snow in the high ranges, and hot, dry conditions in valleys. Cool Interior and Highland climates can be found on the Modoc Plateau, Klamath, Cascade, and Sierra ranges. Variations in slope, elevation, and aspect of valleys and mountains result in a range of microclimates for habitats and wildlife. For example, the San Joaquin Valley, exhibiting a Mediterranean climate, receives sufficient springtime rain to support grassland habitats, while still remaining hot and relatively dry in summer. Steppe climates include arid, shrub-dominated habitats that can be found in the Owens Valley, east of the Sierra Nevada, and San Diego, located in coastal southern California (CDFW 2015).

The marine climate has profound influence over terrestrial climates, particularly near the coast. Additionally, the state is known for variability in precipitation because of the El Niño-Southern Oscillation (ENSO) and the Pacific Decadal Oscillation (PDO). Oscillations are the cyclical shifting of high and low pressure systems, as evidenced by the wave pattern of the jet stream in the northern hemisphere. The ENSO is the cycle of air pressure systems influenced by the location of warm and cold sea temperatures. El Niño events occur when waters are warmer in the eastern Pacific Ocean, typically resulting in greater precipitation in southern California and less precipitation in northern California, and La Niña events occur when waters are colder in the eastern Pacific resulting in drier than normal conditions in southern California and wetter conditions in northern California during late summer and winter. The warmer ocean temperatures associated with El Niño conditions also result in decreased upwelling in the Pacific Ocean (CDFW 2015).

California has the highest numbers of native and endemic plant species of any state, with approximately 6,500 species, subspecies, and varieties of plants, representing 32 percent of all vascular plants in the U.S. Nearly one-third of the state's plant species are endemic, and California has been recognized as one of 34 global hotspots for plant diversity. Within the California Floristic Province, which encompasses the Mediterranean area of Oregon, California, and northwestern Baja, 2,124 of the 3,488 species are endemic, representing a 61 percent rate of endemism. Over 200 species, subspecies, and varieties of native plants are designated as rare, threatened, or endangered by state law, and over 2,000 more plant taxa are considered to be of conservation concern (CDFW 2015).

California has a large number of animal species, representing a substantial proportion of the wildlife species nationwide. The state's diverse natural communities provide a wide variety of habitat conditions for wildlife. The state's wildlife species include approximately 100 reptile species, 75 amphibian species, 650 bird species, and 220 mammal species. Additionally, 48 mammals, 64 birds, 72 amphibians and reptiles, and 20 freshwater fish live in California and nowhere else (CDFW 2015).

California exhibits a wide range of aquatic habitats from the Pacific Ocean to isolated hillside seeps, to desert oases that support both water-dependent species and provide

essential seasonal habitat for terrestrial species. Perennial and ephemeral rivers and streams, riparian areas, vernal pools, and coastal wetlands support a diverse array of flora and fauna, including 150 animal and 52 plant species that are designated special-status species. The California Natural Diversity Database identifies 123 different aquatic habitat-types in California, based on fauna. Of these, 78 are stream habitat-types located in seven major drainage systems: Klamath, Sacramento-San Joaquin, North/Central Coast, Lahontan, Death Valley, South Coast, and Colorado River systems. These drainage systems are geologically separated and contain distinctive fishes and invertebrates. California has approximately 70 native resident and anadromous fish species, and 72 percent of the native freshwater fishes in California are either listed, or possible candidates for listing as threatened or endangered, or are extinct (CDFW 2015).

3. Canada

An estimated 140,000 species live in Canada, only half of which have been identified. Most of the larger organisms (i.e., mammals, birds, trees) have been almost completely identified, while the smaller creatures account for most of the unidentified species; over one fifth of all species in Canada are insects. Estimates of how many species of the more obscure groups exist, such as the nematodes, are little more than guesses. There are 353 species in Canada that have been designated as at risk in some way as of May 2000. Within the list, there are several different categories of risk: special concern, threatened, endangered, extirpated (no longer found in Canada but not extinct), and extinct (McGill University 2016).

E. Cultural Resources

1. United States and Canada

Cultural resources include archaeological sites of prehistoric or historic origin, built or architectural resources older than 50 years, traditional or ethnographic resources, and fossil deposits of paleontological importance. The U.S. and Canada have a cultural heritage that dates back to some 25,000-60,000 years ago, when the first known inhabitants of the land that would eventually become the U.S. crossed the Bering land bridge into Alaska.

All areas within the U.S. and Canada have the potential for yielding as yet undiscovered archaeological and paleontological resources and undocumented human remains not interred in cemeteries or marked formal burials. These resources have the potential to contribute to our knowledge of the fossil record or local, regional, or national prehistory or history.

Archaeological resources include both prehistoric and historic remains of human activity. Built environment resources include an array of historic buildings, structures, and objects serving as a physical connection to America’s past. Traditional or ethnographic cultural resources may include Native American sacred sites and traditional resources of any ethnic community that are important for maintaining the

cultural traditions of any group. Paleontological resources, including mineralized, partially mineralized, or unmineralized bones and teeth, soft tissues, shells, wood, leaf impressions, footprints, burrows, and microscopic remains, are more than 5,000 years old and occur mainly in Pleistocene or older sedimentary rock units.

2. California

California was occupied by different prehistoric cultures dating to at least 12,000 to 13,000 years ago. Evidence for the presence of humans during the Paleoindian Period prior to about 8,000 years ago is relatively sparse and scattered throughout the State; most surface finds of fluted Clovis or Folsom projectile points or archaeological sites left by these highly mobile hunter-gatherers are associated with Pleistocene lakeshores, the Channel Islands, or the central and southern California coast (Rondeau et al 2007). Archaeological evidence from two of the Northern Channel Islands located off the coast from Santa Barbara indicates the islands were colonized by Paleoindian peoples at least 12,000 years ago, likely via seaworthy boats (Erlandson et al 2007). By 10,000 years ago, inhabitants of this coastal area were using fishhooks, weaving cordage and basketry, hunting marine mammals and sea birds, and producing ornamental shell beads for exchange with people living in the interior of the State (Erlandson et al 2007). This is the best record of early maritime activity in the Americas, and combined with the fluted points, indicates California was colonized by both land and sea during the Paleoindian period (Jones and Klar 2007).

With climate changes between 10,000 and 7,000 years ago at the end of the Pleistocene and into the early Holocene, Lower Archaic peoples adjusted to the drying of pluvial lakes, rise in sea level, and substantial alterations in vegetation communities. Approximately 6,000 years ago, vegetation communities similar to those of the present were established in the majority of the state, while the changes in sea level also affected the availability of estuarine resources (Jones and Klar 2007). The archaeological record indicates subsistence patterns during the Lower Archaic and subsequent Middle Archaic Period shifted to an increased emphasis on plant resources, as evidenced by an abundance of milling implements in archaeological sites dating between 8,000 and 3,000 years ago.

Approximately 3,000 years ago, during the Upper Archaic and Late Prehistoric Periods, the complexity of the prehistoric archaeological record reflects increases in specialized adaptations to locally available resources such as acorns and salmon, in permanently occupied settlements, and in the expansion of regional populations and trade networks (Moratto 1984; Jones and Klar 2007). During the Upper Archaic, marine shell beads and obsidian continue to be the hallmark of long-distance trade and exchange networks developed during the preceding period (Hughes and Milliken 2007). Large shell midden/mounds at coastal and inland sites in central and southern California, for example, attest to the regular reuse of these locales over hundreds of years or more from the Upper Archaic into the Late Prehistoric period. In the San Francisco Bay region alone, over 500 shell mounds were documented in the early 1900s (Moratto 1984).

Changes in the technology used to pursue and process resources are some of the hallmarks of the Late Prehistoric period. These include an increase in the prevalence of mortars and pestles, a diversification in types of watercraft and fishhooks, and the earliest record for the bow and arrow in the State that occurs in both the Mojave Desert and northeast California nearly 2,000 years ago (Jones and Klar 2007). The period also witnessed the beginning of ceramic manufacture in the southeast desert region, southwest Great Basin, and parts of the Central Valley.

During the Late Prehistoric period, the development of social stratification and craft specialization accompanied the increase in sedentism, as indicated by the variety of artifacts, including bone tools, coiled and twined basketry, obsidian tools, marine shell beads, personal ornaments, pipes, and rattles, by the use of clamshell disk beads and strings of dentalium shell as a form of currency, and by variation in burial types and associated grave goods (Moratto 1984; Jones and Klar 2007). Pictographs, painted designs that are likely less than 1,000 years old, and other non-portable rock art created during this period likely had a religious or ceremonial function (Gilreath 2007). Osteological evidence points to intergroup conflict and warfare in some regions during this period (Jones and Klar 2007), and there also appears to have been a decline or disruption in the long-distance trade of obsidian and shell beads approximately 1,200 years ago in parts of the State (Hughes and Milliken 2007).

a) Ethnographic Overview

At the time of European contact, California was the home of approximately 310,000 indigenous peoples with a complex of cultures distinguished by linguistic affiliation and territorial boundaries (Kroeber 1925; Cook 1978; Heizer 1978; Ortiz 1983; d'Azevedo 1986). At least 70 distinct native Californian cultural groups, with even more subgroups, inhabited the vast lands within the State. The groups and subgroups spoke between 74 and 90 languages, plus a large number of dialects (Shipley 1978; University of California at Berkeley 2009-2010).

In general, these mainly sedentary, complex hunter-gatherer groups of indigenous Californians shared similar subsistence practices (hunting, fishing, and collecting plant foods), settlement patterns, technology, material culture, social organization, and religious beliefs (Kroeber 1925; Heizer 1978; Ortiz 1983; d'Azevedo 1986). Permanent villages were situated along the coast, interior waterways, and near lakes and wetlands. Population density among these groups varied, depending mainly on availability and dependability of local resources, with the highest density of people in the northwest coast and Santa Barbara Channel areas and the least in the State's desert region (Cook 1976). Networks of foot trails were used to connect groups to hunting or plant gathering areas, rock quarries, springs or other water sources, villages, ceremonial places, or distant trade networks (Heizer 1978).

The social organization of California's native peoples varied throughout the State, with villages or political units generally organized under a headman who was also the head of a lineage or extended family or achieved the position through wealth (Bean 1978). For some groups, the headman also functioned as the religious ceremonial leader. Influenced by their Northwest Coast neighbors, the differential wealth and power of

individuals was the basis of social stratification and prestige between elites and commoners for the Chilula, Hupa, Karok, Tolowa, Wiyot, and Yurok in the northwest corner of the State. Socially complex groups were also located along the southern California coast where differential wealth resulted in hierarchical classes and hereditary village chiefs among the Chumash, Gabrielino, Juaneño, and Luiseño (Bean and Smith 1978; Arnold and Graesch 2004).

At the time of Spanish contact, religious practices among native Californian groups varied, but ethnographers have recognized several major religious systems (Bean and Vane 1978). Many of the groups in the north-central part of the State practiced the *Kuksu* cult, primarily a ceremonial and dance organization, with a powerful shaman as the leader. Log drums, flutes, rattles, and whistles accompanied the elaborate ceremonial dances. The World Renewal cult in the northwestern corner of the State extended as far north as Alaska, entailed a variety of annual rites to prevent natural disasters, maintain natural resources and individual health, and were funded by the wealthy class. The *Toloache* cult was widespread in central and southern California and involved the use of narcotic plant (commonly known as datura or jimsonweed) materials to facilitate the acquisition of power. On the southern coast among Takic-speaking groups, the basis of Gabrielino, Juaneño, and Luiseño religious life was the *Chinigchinich* cult, which appeared to have developed from the Toloache cult. Chinigchinich, the last of a series of heroic mythological figures, gave instruction on laws and institutions, taught people how to dance, and later withdrew into heaven where he rewarded the faithful and punished those who disobeyed his laws. The Chinigchinich religion seems to have been relatively new when the Spanish arrived, and could have been influenced by Christianity.

Trade and exchange networks were a significant part of the economy and social organization among California's Native American groups (Heizer 1978). Obsidian, steatite, beads, acorns, baskets, animal skins, and dried fish were among the variety of traded commodities. Inland groups supplied obsidian from sources along the Sierra Nevada Mountains, in Napa Valley, and in the northeast corner of the State. Coastal groups supplied marine shell beads, ornaments, and marine mammal skins. In addition to trading specific items, clamshell disk beads made from two clam species available on the Pacific coast were widely used as a form of currency (Kroeber 1922). In northwestern California, groups used strings of dentalium shell as currency.

The effect of Spanish settlement and missionization in California marks the beginning of a devastating disruption of native culture and life ways, with forced population movements, loss of land and territory (including traditional hunting and gathering locales), enslavement, and decline in population numbers from disease, malnutrition, starvation, and violence during the historic period (Castillo 1978). In the 1830s, foreign disease epidemics swept through the densely populated Central Valley, adjacent foothills, and North Coast Ranges decimating indigenous population numbers (Cook 1978). By 1850, with their lands, resources and way of life being overrun by the steady influx of non-native people during the Gold Rush, California's native population was reduced to about 100,000; by 1900, there were only 20,000 or less than seven percent

of the pre-contact number. Existing reservations were created in California by the federal government beginning in 1858 but encompass only a fraction of native lands.

In 2004, the Native American population in California was estimated at over 383,000 (OPR 2005). Although acknowledged as non-federally recognized California Native American tribes on the contact list maintained by the Native American Heritage Commission (NAHC), many groups continue to await federal tribal status recognition. As of 2005, there were 109 federally recognized tribes within the state, along with dozens of non-federally recognized tribes. Members of these tribes have specific cultural beliefs and traditions with unique connections to areas of California that are their ancestral homelands.

b) Historic Overview

Post-contact history for the State is generally divided into the Spanish period (1769–1822), Mexican period (1822–1848), and American period (1848–present). The establishment of Fort Ross by Alaska-based Russian traders also influenced post-contact history for a short period (1809–1841) in the region north of San Francisco Bay. Although there were brief visits along the Pacific coast by European explorers (Spanish, Russian, and British) between 1529 and 1769 of the territory claimed by Spain, the expeditions did not journey inland.

i. Spanish Period (1769–1822)

Spain's colonization of California began in 1769 with the overland expeditions from San Diego to San Francisco Bay by Lt. Colonel Gaspar de Portolá, and the establishment of a mission and settlement at San Diego. Between 1769 and 1823, the Spanish and the Franciscan Order established a series of 21 missions paralleling the coast along El Camino Real between San Diego and Sonoma (Rolle 1969). Between 1769 and 1782, Spain built four presidios (San Diego, Monterey, San Francisco, and Santa Barbara) to protect the missions, and by 1871 had established two additional pueblos at Los Angeles and San José.

Under Spanish law, large tracts of land, including cattle ranches and farms, fell under the jurisdiction of the missions. Native Americans were removed from their traditional lands, converted to Christianity, concentrated at the missions, and used as labor on the mission farms and ranches (Castillo 1978). Since the mission friars had civil as well as religious authority over their converts, they held title to lands in trust for indigenous groups. The lands were to be repatriated once the native peoples learned Spanish laws and culture.

iii) Russian Period (1809–1841)

In 1809, Alaska-based Russians started exploring the northern California coast with the goal of hunting otter and seal and feeding their Alaskan colonies. The first Russian settlement was established in 1811–1812 by the Russian–American Fur Company to protect the lucrative marine fur trade and to grow produce for their Alaskan colonies. In 1841, as a result of the decline in local sea otter population and the failure of their agricultural colony, combined with a change in international politics, the Russians withdrew from California (Schuyler 1978).

iv) Mexican Period (1822–1848)

Following independence from Spain in 1822, the economy during the Mexican period depended on the extensive rancho system, carved from the former Franciscan missions and at least 500 land grants awarded in the State's interior to Mexican citizens (Beck and Haase 1974; Staniford 1975). Captain John Sutter, who became a Mexican citizen, received the two largest land grants in the Sacramento Valley. In 1839, Sutter founded the trading and agricultural empire named New Helvetia that was headquartered at Sutter's Fort, near the confluence of the Sacramento and American Rivers in today's City of Sacramento (Hoover et al 2002).

Following adoption of the Secularization Act of 1833, the Mexican government privatized most Franciscan lands, including holdings of their California missions. Although secularization schemes had called for redistribution of lands to Native American neophytes who were responsible for construction of the mission empire, the vast mission lands and livestock holdings were instead redistributed by the Mexican government through several hundred land grants to private, non-indigenous ranchers (Castillo 1978; Hoover et al 2002). Most Native American converts returned to traditional lands that had not yet been colonized or found work with the large cattle ranchos being carved out of the mission lands.

v) American Period (1848–present)

In 1848, shortly after California became a territory of the U.S. with the signing of the Treaty of Guadalupe Hidalgo ending Mexican rule, gold was discovered on the American River at Sutter's Mill in Coloma. The resulting Gold Rush era influenced the history of the State, the nation, and the world. Thousands of people flocked to the gold fields in the Mother Lode region that stretches along the western foothills of the Sierra Nevada Mountains, and to the areas where gold was also discovered in other parts of the State, such as the Klamath and Trinity River basins (California Department of Transportation [Caltrans] 2008). In 1850, California became the 31st state, largely as a result of the Gold Rush.

c) Paleontological Setting

California's fossil record is exceptionally prolific with abundant specimens representing a diverse range of marine, lacustrine, and terrestrial organisms recovered from Precambrian rocks as old as 1 billion years to as recent as 6,000 year-old Holocene deposits (refer to geologic timescale in Table A1-2). These fossils provide key data for charting the course of the evolution or extinction of a variety of life on the planet, both locally and internationally. Paleontological specimens also provide key evidence for interpreting paleoenvironmental conditions, sequences and timing of sedimentary deposition, and other critical components of the earth's geologic history. Fossils are considered our most significant link to the biological prehistory of the earth (Jefferson 2004).

Table A1-2: Divisions of Geologic Time

Era	Period	Time in Millions of Years Ago (approximately)	Epoch
		< 0.01	Holocene
		2.6	Pleistocene
		5.3	Pliocene
		23	Miocene
		34	Oligocene
		56	Eocene
		65	Paleocene
	Cretaceous	145	
	Jurassic	200	
	Triassic	251	
	Permian	299	
	Carboniferous	359	
	Devonian	416	
	Silurian	444	
	Ordovician	488	
	Cambrian	542	
Precambrian		2,500	
Source: USGS 2010			

Because the majority of the State was underwater until the Tertiary period, marine fossils older than 65 million years are not common and are exposed mainly in the mountains along the border with Nevada and the Klamath Mountains, and Jurassic shales, sandstones, and limestones are exposed along the edges of the Central Valley, portions of the Coast, Transverse, and Peninsular Ranges, and the Mojave and Colorado Deserts. Some of the oldest fossils in the State, extinct marine vertebrates called conodonts, have been identified at Anza-Borrego Desert SP in Ordovician sediments dating to circa 450 million years ago. Limestone outcrops of Pennsylvanian and Permian in the Providence Mountains SRA contain a variety of marine life, including brachiopods, fusulinids, crinoids, that lived some 300 to 250 million years ago.

Fossils from the Jurassic sedimentary layers in San Joaquin, San Luis Obispo, and Stanislaus counties include ammonites, bivalves, echinoderms and marine reptiles, all of which were common in the coastal waters. Gymnosperms (seed-bearing plants) such as cycads, conifers, and ginkgoes are preserved in terrestrial sediments from this period, evidence that the Jurassic climate was warm and moderately wet. In the great Central Valley, marine rocks record the position of the Cretaceous shoreline as the eroded ancestral Sierra Nevada sediments were deposited east of the rising Coast Ranges and became the rock layers of the Sacramento and San Joaquin valleys. These

Cretaceous sedimentary deposits have yielded abundant fossilized remains of plants, bivalves, ammonites, and marine reptiles (Paleontology Portal 2003).

Along coastal southern California where steep coastal mountains plunged into the warm Pacific Ocean an abundance of fossil marine invertebrates, such as ammonites, nautilus, tropical snails and sea stars, have been found in today's coastal and near-coastal deposits from the Cretaceous Period. A rare armored dinosaur fossil dated to about 75 million years ago during the Cretaceous was discovered in San Diego County during a highway project. It is the most complete dinosaur skeleton ever found in California (San Diego Natural History Museum 2010). The lack of fossil remains of the majority of earth's large vertebrates, particularly terrestrial, marine, and flying reptiles (dinosaurs, ichthyosaurs, mosasaurs, pleisosaurs, and pterosaurs), as well as many species of terrestrial plants, after the end of the Cretaceous and the start of the Tertiary periods 65 million years ago (the K-T boundary) attests to their abrupt extinction.

F. Energy Demand

1. United States

The major energy sources consumed in the U.S. are petroleum (oil), natural gas, coal, nuclear energy, and renewable energy. The major user sectors of these energy sources are residential and commercial buildings, industry, transportation, and electric power. The pattern of energy use varies widely by sector (United States Energy Information Administration [U.S. EIA] 2016a).

Primary energy includes petroleum, natural gas, coal, nuclear energy, and renewable energy. Electricity is a secondary energy source that is generated using these primary forms of energy. For example, coal is a primary energy source that is burned by electric power plants to generate electricity, which is a secondary source of energy. Primary energy is used in residential and commercial buildings, in transportation, by industry, and by electricity generating facilities. The electric power sector is the largest user of primary energy, followed by the transportation sector. The electric power sector uses primary energy to generate electricity. Nearly all electricity is used in buildings and by industry (U.S. EIA 2016a).

Renewable energy plays an important role in reducing greenhouse gas emissions. When renewable energy sources are used, the demand for fossil fuels is reduced. Unlike fossil fuels, non-biomass renewable sources of energy (hydropower, geothermal, wind, and solar) do not directly emit greenhouse gases. More than half of U.S. renewable energy use is for producing electricity. Biomass (wood and waste) is the second most commonly used renewable energy source. Biomass is used to produce heat and steam for industrial purposes, and it is also used for space heating. Biomass also includes biofuels like ethanol and biodiesel, which are used for transportation (U.S. EIA 2016b).

The production and use of biofuels and non-hydroelectric renewable energy sources doubled from 2000 to 2014, mainly because of state and federal government mandates and incentives for renewable energy. The use of renewable fuels is expected to continue to grow over the next 25 years. The U.S. EIA projects that the U.S. will use nonrenewable fuels to meet most of its energy needs through 2040 (U.S. EIA 2016b).

2. California

Excluding Federal offshore areas, California ranks third in the Nation in crude oil production in 2014. California ranks third in the Nation in conventional hydroelectric generation, second in net electricity generation from other renewable energy resources, and first as a producer of electricity from geothermal energy (in 2012). In 2012, California, left with one remaining nuclear power plant after the San Onofre Nuclear Generating Station was permanently shut down in 2012, ranked fourteenth in net electricity generation from nuclear power plants and eighth in nuclear net summer capacity. Average site electricity consumption in California homes is among the lowest in the nation (6.9 megawatt hours per year), according to the U.S. EIA's Residential Energy Consumption Survey last conducted in 2009. In 2012, California's per capita energy consumption ranked 49th in the Nation, due in part to its mild climate and energy efficiency programs (U.S. EIA 2016c).

In 2013, California's in-state electricity generation sources consisted of: 44.3 percent natural gas, 18.8 percent renewable sources, 8.8 percent nuclear, 7.8 percent large hydropower, and 7.8 percent from coal. Approximately 63 percent of total electricity generation was from in-state sources, with the remaining electricity coming from out-of-state imports from the Pacific Northwest (12 percent) and the Southwest (21 percent) (California Energy Commission [CEC] 2014a).

In 2012, Californians consumed 274,449 gigawatt hours (GWh) of electricity and 12,897 million therms of natural gas, primarily in the commercial, residential, and industrial sectors. CEC staff forecast of future energy demand shows that electricity consumption will grow by between 0.79 and 1.56 percent per year between 2014 and 2024; and natural gas consumption is expected to reach up to 12,801 million therms by 2024 for an annual average growth rate of up to 0.02 percent (CEC 2014b).

The CEC is the State's primary energy policy and planning agency. Created by the Legislature in 1974, and located in Sacramento, six basic responsibilities guide the CEC as it sets state energy policy: forecasting future energy needs; promoting energy efficiency and conservation by setting the State's appliance and building efficiency standards; supporting public interest energy research that advances energy science and technology through research, development and demonstration programs; developing renewable energy resources and alternative renewable energy technologies for buildings, industry and transportation; licensing thermal power plants 50 megawatts or larger; and planning for and directing state response to energy emergencies.

The CPUC also plays a key role in regulating investor-owned electric, natural gas, telecommunications, water, railroad, rail transit, and passenger transportation

companies. The CPUC regulates investor-owned electric and natural gas utilities operating in California, including Pacific Gas and Electric Company, Southern California Edison, San Diego Gas and Electric Company, and Southern California Gas Company.

3. Canada

Canada is a world leader in hydro-electricity, which accounts for 59 percent of the country's electricity supply. Other sources include coal, uranium, natural gas, petroleum and non-hydro renewable sources. Canada is the world's fifth-largest producer and fourth-largest exporter of natural gas. As part of a fully integrated and continental natural gas market, Canada moves its natural gas resources across provincial and national borders, from supply basins to demand centers (NRCAN 2016b).

G. Geology, Seismicity, Soils, and Mineral Resources

1. United States

The U.S. has a diverse, complex and seismically active geology that includes a vast array of landforms. Soils are as diverse as America's geology, and are described and characterized individually and collectively with other soils, and their various compatible uses in soil surveys published by the U.S. Department of Agriculture (USDA). Soils are fundamental and largely non-renewable resources that are the basis for high-level sustained yields of agricultural commodities, forest products, and provide support to the wide variety of ecological communities throughout the State.

The geology of the U.S. is very complex and can be divided into roughly five physiographic provinces: the American cordillera, the Canadian shield, the stable platform, the coastal plain, and the Appalachian orogenic belt. In Alaska, the geology is typical of the cordillera, whereas in Hawaii the major islands consist of Neogene volcanic erupted over a hotspot.

2. California

The state's topography is highly varied and includes 1,340 miles of seacoast, as well as high mountains, inland flat valleys, and deserts. Elevations in California range from 282 feet below sea level in Death Valley to 14,494 feet at the peak of Mount Whitney. The mean elevation of California is approximately 2,900 feet. The climate of California is as highly varied as its topography. Depending on elevation, proximity to the coast, and altitude, climate types include temperate oceanic, highland, sub-arctic, Mediterranean, steppe, and desert (USGS 1995). The average annual precipitation across all California climate types is approximately 23 inches and approximately 75 percent of the state's annual precipitation falls between November and March, primarily in the form of rain, with the exception of high mountain elevations (DWR 2003). Average annual precipitation ranges from more than 100 inches in the mountainous areas within the Smith River in Del Norte County to less than 2 inches in Death Valley, illustrating the extreme differences in precipitation levels within the State (Mount 1995). Overall,

northern California is wetter than southern California with the majority of the State's annual precipitation occurring in the northern coastal region.

a) Geology

Plate tectonics and climate have played major roles in forming California's dramatic landscape. California is located on the active western boundary of the North American continental plate in contact with the oceanic Pacific Plate and the Gorda Plate north of the Mendocino Triple Junction. The dynamic interactions between these three plates and California's climate are responsible for the unique topographic characteristics of California, including rugged mountain ranges, long and wide flat valleys, and dramatic coastlines. Tectonics and climate also have a large effect on the occurrence natural environmental hazards, such as earthquakes, landslides, and volcanic formations.

b) Landslides

Landsliding or mass wasting is a common erosional process in California and has played an integral part in shaping the State's landscape. Typically, landslides occur in mountainous regions of the State, but they can also occur in areas of low relief, including coastal bluffs, along river and stream banks, and inland desert areas. Landsliding is the gravity-driven downhill mass movement of soil, rock, or both and can vary considerably in size, style and rate of movement, and type depending on the climate of a region, the steepness of slopes, rock type and soil depth, and moisture regime (Harden 1997).

c) Earthquakes

Earthquakes are a common and unpredictable occurrence in California. The tectonic development of California began millions of years ago by a shift in plate tectonics that converted the passive margin of the North American plate into an active margin of compressional and translational tectonic regimes. This shift in plate tectonics continues to make California one of the most geomorphically diverse, active, and picturesque locations in the U.S. While some areas of California are more prone to earthquakes, such as northern, central, and southern coastal areas of California, all areas of California are prone to the effects of ground shaking due to earthquakes. While scientists have made substantial progress in mapping earthquake faults where earthquakes are likely to occur, and predicting the potential magnitude of an earthquake in any particular region, they have been unable to precisely predict where or when an earthquake will occur and what its magnitude will be.

d) Tsunamis

Coastal communities around the circum Pacific have long been prone to the destructive effects of tsunamis. Tsunamis are a series of long-period, high-magnitude ocean waves that are created when an outside force displaces large volumes of water. Throughout time, major subduction zone earthquakes in both the Northern and Southern Hemispheres have moved the Earth's crust at the ocean bottom sending vast amounts of waters into motion and spreading tsunami waves throughout the Pacific Ocean.

Tsunamis can also occur from subareal and submarine landslides that displace large volumes of water. Subaeral landslide-generated tsunamis can be caused by seismically generated landslides, rock falls, rock avalanches, and eruption or collapse of island or coastal volcanoes. Submarine landslide-generated tsunamis are typically caused by major earthquakes or coastal volcanic activity. In contrast to a seismically generated tsunami, seismic seiches are standing waves that are caused by seismic waves traveling through a closed (lake) or semi-enclosed (bay) body of water. Due to the long-period seismic waves that originate after an earthquake, seiches can be observed several thousand miles away from the origin of the earthquakes. Small bodies of water, including lakes and ponds, are especially vulnerable to seismic seiches.

e) Volcanoes

A volcano is an opening in the Earth's crust through which magma escapes to the surface where it is extruded as lava. Volcanism may be spectacular, involving great fountains of molten rock, or tremendous explosions that are caused by the build-up of gases within the volcano (Ritchie and Gates 2001). Some of the most active volcanic areas in California are located within the Cascade Range - a volcanic chain that is a result of compressional tectonics along the Cascadia subduction zone.

f) Active Faults

A fault is defined as a fracture or zone of closely associated fractures along rocks that on one side have been displaced with respect to those on the other side. Most faults are the result of repeated displacement that may have taken place suddenly or by slow creep. A fault is distinguished from fractures or shears caused by landsliding or other gravity-induced surficial failures. A fault zone is a zone of related faults that commonly are braided and subparallel, but may be branching and divergent. A fault zone has significant width (with respect to the scale of the fault being considered, portrayed, or investigated), ranging from a few feet to several miles (Bryant and Hart 2007).

In the State of California earthquake faults have been designated as being active through a process that has been described by the 1972 Alquist-Priolo Earthquake Fault Zoning Act. An active fault is defined by the State as one that has "had surface displacement within Holocene time (about the last 11,000 years)." This definition does not, of course, mean that faults lacking evidence for surface displacement within Holocene time are necessarily inactive. A fault may be presumed to be inactive based on satisfactory geologic evidence; however, the evidence necessary to prove inactivity sometimes is difficult to obtain and locally may not exist.

The CGS classifies the regional significance of mineral resources in accordance with the California Surface Mining and Reclamation Act of 1975 and assists in the designation of land containing significant aggregate resources. Mineral Resources Zones (MRZs) have been designated to indicate the significance of mineral deposits. The MRZ categories follow:

MRZ-1: Areas where adequate information indicates that no significant mineral deposits are present or where it is judged that little likelihood exists for their presence.

MRZ-2: Areas where adequate information indicates significant mineral deposits are present, or where it is judged that a high likelihood exists for their presence.

MRZ-3: Areas containing mineral deposits the significance of which cannot be evaluated from available data.

MRZ-4: Areas where available information is inadequate for assignment to any other MRZ.

California ranks as 7th in the U.S. for non-fuel mineral production, accounting for approximately 3.9 percent of the nation's total. In 2011, there were approximately 700 active mineral mines that produced: sand and gravel, boron, Portland cement, crushed stone, gold, masonry cement, clays, gemstones, gypsum, salt, silver, and other minerals (Clinkenbeard and Smith 2013).

3. Canada

Canada's landscape is diversified and comprises several distinctive areas, called physiographic regions, each of which has its own topography and geology. The physical geography of Canada comprises two great parts: the Shield and the Borderlands. The Shield consists of a core of old, massive, Precambrian crystalline rocks. The Borderlands areas are formed by younger rocks and surround the Shield like two rings. The inner ring comprises a chain of lowlands, plains and plateaus of generally flat-lying sedimentary rocks. The outer ring consists of discontinuous areas of mountains and plateaus in which the younger rocks are deformed. Each of these areas is divided into regions, each of which comprises many smaller subdivisions that are distinctive based on their topography and geology (NRCAN 2016c).

H. Greenhouse Gases

1. United States and Canada

Climate change is a global problem. GHGs are global pollutants, unlike criteria air pollutants and toxic air contaminants, which are pollutants of regional and local concern. Whereas pollutants with localized air quality effects have relatively short atmospheric lifetimes (about one day), GHGs have long atmospheric lifetimes (one to several thousand years). GHGs persist in the atmosphere for long enough time periods to be dispersed around the globe. Although the lifetime of any particular GHG molecule is dependent on multiple variables and cannot be determined with any certainty, it is understood that more carbon dioxide (CO_2) is emitted into the atmosphere than is sequestered by ocean uptake, vegetation, and other forms of sequestration. Of the total annual human-caused CO_2 emissions, approximately 55 percent is sequestered through ocean and land uptake every year, averaged over the last 50 years, whereas

the remaining 45 percent of human-caused CO_2 emissions remains stored in the atmosphere (Intergovernmental Panel on Climate Change [IPCC] 2013).

The quantity of GHGs in the atmosphere that ultimately result in climate change is not precisely known, but is enormous; no single project alone would measurably contribute to an incremental change in the global average temperature, or to global, local, or micro climates.

a) Attributing Climate Change—The Physical Scientific Basis

Certain gases in the earth's atmosphere, classified as GHGs, play a critical role in determining the earth's surface temperature. Solar radiation enters the earth's atmosphere from space. A portion of the radiation is absorbed by the earth's surface and a smaller portion of this radiation is reflected back toward space. This absorbed radiation is then emitted from the earth as low-frequency infrared radiation. The frequencies at which bodies emit radiation are proportional to temperature. The earth has a much lower temperature than the sun; therefore, the earth emits lower frequency radiation. Most solar radiation passes through GHGs; however, infrared radiation is absorbed by these gases. As a result, radiation that otherwise would have escaped back into space is instead "trapped," resulting in a warming of the atmosphere. This phenomenon, known as the greenhouse effect, is responsible for maintaining a habitable climate on earth.

Prominent GHGs contributing to the greenhouse effect are CO_2, methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). Human-caused emissions of these GHGs in excess of natural ambient concentrations are believed responsible for intensifying the greenhouse effect and leading to a trend of unnatural warming of the earth's climate, known as global climate change or global warming.

According to the Intergovernmental Panel on Climate Change (IPCC, a scientific body established by the World Meteorological Organization (WMO) and by the United Nations Environment Programme (UNEP), available scientific evidence supports the conclusion that most of the increased average global temperatures since the mid-20th century is very likely due to human-induced increases in GHG concentrations. (IPCC 2014).

The current post-industrial warming trend differs alarmingly from past changes in the Earth's climate because GHG emissions are higher and warming is occurring faster than at any other time on record within the past 650,000 years. Historical long-term as well as decadal and inter-annual fluctuations in the Earth's climate resulted from natural processes such as plate tectonics, the Earth's rotational orbit in space, solar radiation variability, and volcanism. The current trend derives from an added factor: human activities, which have greatly intensified the natural greenhouse effect, causing global warming. GHG emissions from human activities that contribute to climate change include the burning of fossil fuels (such as coal oil and natural gas), cutting down trees (deforestation) and developing land (land-use changes). The burning of fossil fuels emits GHGs into the atmosphere, while deforestation and land-use changes remove

trees and other kinds of vegetation that store ("sequester") carbon dioxide. Emissions of GHGs due to human activities have continued to increase over 1970 to 2010, with larger absolute increases between 2000 and 2010. Emissions of CO_2 from fossil fuel combustion and industrial processes contributed about 78 percent of the total GHG emissions increase from 1970 to 2010 (IPCC 2014).

A growing recognition of the wide-ranging impacts of climate change has fueled efforts over the past several years to reduce GHG emissions. In 1997, the Kyoto Protocol set legally binding emissions targets for industrialized countries, and created innovative mechanisms to assist these countries in meeting these targets. The Kyoto Protocol took effect in 2004, after 55 parties to the Convention had ratified it (The UN Climate Change Convention and the Kyoto Protocol). Six major GHGs have been the focus of efforts to reduce emissions and are included in AB 32: CO_2, CH_4, N_2O, HFCs, PFCs and SF_6. They are regulated under the Kyoto Protocol. Nitrogen trifluoride (NF_3) was later added to the list of important GHGs to reduce and codified in California statute.

The "global warming potential" (GWP) metric is used to convert all GHGs into "CO_2-equivalent" (CO_2e) units for a specific time frame. GWPs from the IPCC fourth assessment report over a 100-year warming horizon are used as the national and international standard in GHG inventory development; however, GWPs over a 20-year time horizon are also available and can be more applicable for consideration of short-lived climate pollutants. Each gas's GWP is defined relative to CO_2 for the given time frame. For example, N_2O's 100-yr GWP is 298, meaning a unit mass of N_2O warms the atmosphere 298 times more than a unit mass of CO_2. SF_6 and PFCs have extremely long atmospheric lifetimes, resulting in their essentially irreversible accumulation in the atmosphere once emitted. However, in terms of quantity of emissions, CO_2 dominates world and U.S. GHG emissions.

Because the major GHGs have longer lives, they build up in the atmosphere so that past, present and future emissions ultimately contribute to total atmospheric concentrations. Thus, while reducing emissions of conventional air pollutants decreases their concentrations in the atmosphere in a relatively short time, atmospheric concentrations of the major GHGs can only be gradually reduced over years and decades. More specifically, the rate of emission of CO_2 currently greatly exceeds its rate of removal, and the slow and incomplete removal implies that small to moderate reductions in its emissions would not result in stabilization of CO_2 concentrations, but rather would only reduce the rate of its growth in coming decades. Many of the same activities that emit conventional air pollutants also emit GHGs (e.g., the burning of fossil fuels to produce electricity, heat or drive engines and the burning of biomass). Some conventional air pollutants also have greenhouse effects; for example, soot/black carbon and tropospheric ozone (see Short-Lived Climate Pollutants below).

GHGs retain heat in the atmosphere, contributing to global warming. The predominant GHGs are CO_2, N_2O, CH_4, SF_6, HFCs, PFCs, and NF_3. GHGs are measured in $MMTCO_2e$ and are calculated based on GWP values. GWP is a scale that normalizes other GHGs based on the heat retention properties of CO_2, which is assigned a value of

1.0. The GWP and atmospheric lifetimes of the GHG subject to the Cap-and-Trade Program are presented below (Table A1-3).

Table A1-3: Atmospheric Lifetimes and GWP of GHGs

GHG	GWP (100 year, SAR)	Atmospheric Lifetime (years)
Carbon Dioxide (CO_2)	1.0	Variable
Nitrous Oxide (N_2O)	310	120
Methane (CH_4)	21	12
Sulfur Hexafluoride (SF_6)	23,900	3,200
Hydrofluorocarbons (HFCs)	Each HFC has its own GWP characteristics, ranging from 140 years (HFC-152a) to 11,700 years (HFC-23).	Most HFCs have atmospheric lifetimes of less than 15 years. The atmospheric lifetime of HFC-152a is about 1-year while the lifetime of HFC-23 is 260 years.
Perfluorocarbons (PFCs)	The two most prolific anthropogenic PFCs are CF_4 (tetrafluoromethane) and C_2F_6 (hexafluoroethane). The GWP of CF_4 is 6,500 and the GWP of C_2F_6 is 9,200.	CF_4 has an atmospheric lifetime of 50,000 years. C_2F_6 has an atmospheric lifetime of 10,000 years.
Nitrogen Trifluoride (NF_3)*	17,200*	740*
*Nitrogen Trifluoride is not included in the UNFCCC SAR.		

b) Attributing Climate Change—Greenhouse Gas Emission Sources

Emissions of GHGs contributing to global climate change are attributable in large part to human activities associated with the transportation, electricity, industrial/manufacturing, utility, residential, commercial and agricultural sectors. In California, the transportation sector is the largest emitter of GHGs, followed by electricity generation. Anthropogenic emissions of CO_2 are byproducts of fossil fuel combustion. Methane, a potent GHG, is primarily emitted by livestock and landfills with a smaller contribution from fugitive emissions from oil and gas operations and natural gas transmission and distribution. N_2O is also largely attributable to agricultural practices, primarily from nitrogen-based fertilizer and manure application to soils.

Carbon dioxide equivalent is a measurement that uses GWP to account for the fact that different GHGs have different potential to retain infrared radiation in the atmosphere and contribute to the greenhouse effect. The GWP is dependent on the lifetime, or persistence, of the gas molecule in the atmosphere and the specific infrared absorption

pattern and strength. For example, the IPCC Fourth Assessment Report 100-yr GWP for methane used in the U.S. EPA and California GHG inventory defines 1 ton of methane as equivalent to 25 tons of CO_2 (IPCC 2013). Therefore, methane is a much more potent GHG than CO_2. Expressing emissions in CO_2e takes the contributions of all GHG emissions to the greenhouse effect and converts them to a single unit equivalent to the effect that would occur if only CO_2 were being emitted.

The California GHG inventory compiles statewide anthropogenic GHG emissions and sinks. It includes estimates for CO_2, methane, N_2O, SF_6, NF_3, HFCs, and PFCs. The current inventory covers years 2000 to 2014 (available at http://www.arb.ca.gov/cc/inventory/data/data.htm).

In 2014, total GHG emissions were 441.5 million metric tons of CO_2 equivalent (($MMTCO_2e$), a decrease of 2.8 $MMTCO_2e$ compared to 2013. This represents an overall decrease of 9.4 percent since peak levels in 2004. During the 2000 to 2014 period, per capita GHG emissions in California have continued to drop from a peak in 2001 of 13.9 tonnes per person to 11.4 tonnes per person in 2014; an 18 percent decrease. Overall trends in the inventory also demonstrate that the carbon intensity of California's economy (the amount of carbon pollution per million dollars of gross domestic product [GDP]) is declining; representing a 28 percent decline since the 2001 peak, while the state's GDP has grown (CARB 2016a).

c) Short-Lived Climate Pollutants

Climate policy and research have mainly concentrated on long-term climate change and controlling the long-lived GHGs. However, there is growing recognition within the scientific community that efforts to address climate change should also focus on actions to reduce climate-warming substances with much shorter atmospheric lifetimes. These non-CO_2 pollutants, known as "short-lived climate pollutants," include methane, short lived fluorinated-gases (primarily HFCs), black carbon, and tropospheric ozone (CARB 2016b).

d) Adaptation to Climate Change

According to the IPCC global average temperature is expected to increase relative to the 1986-2005 period by 0.3–4.8 degrees Celsius (°C) (0.5-8.6 degrees Fahrenheit [°F]) by the end of the 21st century (2081-2100), depending on future GHG emission scenarios (IPCC 2014). According to the California Natural Resources Agency, temperatures in California are projected to increase 2.7°F above 2000 averages by 2050 and, depending on emission levels, 4.1–8.6°F by 2100 (California Natural Resources Agency [CNRA] 2012). Resource areas other than air quality and global average temperature could be indirectly affected by the accumulation of GHG emissions. For example, an increase in the global average temperature is expected to result in a decreased volume of precipitation falling as snow in California and an overall reduction in snowpack in the Sierra Nevada. Snowpack in the Sierra Nevada provides both water supply (runoff) and storage (within the snowpack before melting), which is a major source of supply for the state. Based upon historical data and modeling, the California Department of Water Resources (DWR) projects that the Sierra snowpack will decrease by 25 to 40 percent

from its historic average by 2050 (DWR 2008). An increase in precipitation falling as rain rather than snow also could lead to increased potential for floods because water that would normally be held in the Sierra Nevada until spring could flow into the Central Valley concurrently with winter storm events (CNRA 2012). This scenario would place more pressure on California's levee/flood control system.

Throughout the past century precipitation (i.e., rain and snow) has followed the expected pattern of a largely Mediterranean climate with wet winters and dry summers, and considerable variability from year to year. No consistent trend in the overall amount of precipitation has been detected, except that a larger proportion of total precipitation is falling as rain instead of snow. In addition, during the last 35 years, the Sierra Nevada range has witnessed both the wettest and the driest years on record of more than 100 years. While intermittent droughts have been a common feature of the State's climate, evidence from tree rings and other indicators reveal that over the past 1,500 years, California has experienced dry spells that persisted for several years or even decades (CEC 2012).

Another outcome of global climate change is sea level rise. Sea level rose approximately seven inches during the last century and, assuming that sea-level changes along the California coast continue to reflect global trends, sea level along the state's coastline in 2050 could be 10-18 inches higher than in 2000, and 31-55 inches higher by the end of this century (CNRA 2012).

As the existing climate throughout California changes over time, the ranges of various plant and wildlife species could shift or be reduced, depending on the favored temperature and moisture regimes of each species. In the worst cases, some species would become extinct or be extirpated from the state if suitable conditions are no longer available (CNRA 2012).

Changes in precipitation patterns and increased temperatures are expected to alter the distribution and character of natural vegetation and associated moisture content of plants and soils. An increase in frequency of extreme heat events and drought are also expected. These changes are expected to lead to increased frequency and intensity of large wildfires (CNRA 2012).

The effects of global climate change could lead to a variety of secondary effects to public health, water supply, energy supply, sea level, wildfire risks, and ecosystems. Recent data, climate projections, topographic, demographic, and land use information have led to the findings that:

- The state's electricity system is more vulnerable than was previously understood.
- The Sacramento-San Joaquin Delta is sinking, putting levees at growing risk.
- Wind and waves, in addition to faster rising seas, will worsen coastal flooding.

- Animals and plants need connected “migration corridors” to allow them to move to more suitable habitats to avoid serious impacts.

- Native freshwater fish are particularly threatened by climate change.

- Minority and low-income communities face the greatest risks from climate change.

- There are effective ways to prepare for and manage climate change risks, but local governments face many barriers to adapting to climate change; these can be addressed so that California can continue to prosper.

At the same time, the State has recognized the need to adapt to climate change impacts that can no longer be avoided. In 2014, the CNRA released the Safeguarding California Plan, which serves as an update to the 2009 California Climate Adaptation Strategy. The many adaptation planning efforts underway in virtually every State agency, in numerous regions and local communities, as well as in private businesses suggest that CEOs, elected officials, planners, and resource managers understand the reality that California and the world is facing.

In fact, the latest climate science makes clear that State, national and global efforts to mitigate climate change must be accelerated to limit global warming to levels that do not endanger basic life-support systems and human well-being. Success in mitigation will keep climate change within the bounds that allow ecosystems and society to adapt without major disruptions. Further advances in integrated climate change science can inform California’s and the world’s climate choices and help ensure a resilient future (CEC 2012).

2. California

Like its topography, California’s climate is varied and tends toward extremes. Generally, there are two seasons in California: 1) a long, dry summer, with low humidity and cool evenings and 2) a mild, rainy winter, except in the high mountains, where four seasons prevail and snow lasts from November to April. The one climatic constant for the state is summer drought.

California has four main climatic regions. Mild summers and winters prevail in central coastal areas, where temperatures are more equable than virtually anywhere else in the U.S. For example, differences between average summer and winter temperatures between San Francisco and Monterey for example are seldom more than 10°F (6°C). During the summer there are heavy fogs in San Francisco and all along the coast. Mountainous regions are characterized by milder summers and colder winters, with markedly low temperatures at high elevations. The Central Valley has hot summers and cool winters, while the Imperial Valley and eastern deserts are marked by very hot, dry summers, with temperatures frequently exceeding 100°F (38°C).

Average annual temperatures for the state range from 47°F (8°C) in the Sierra Nevada to 73°F (23°C) in the Imperial Valley. The highest temperature ever recorded in the U.S. was 134°F (57°C), registered in Death Valley on 10 July 1913. Death Valley has the hottest average summer temperature in the Western Hemisphere, at 98°F (37°C). The state's lowest temperature was -45°F (-43°C), recorded on 20 January 1937 at Boca, near the Nevada border.

Among the major population centers, Los Angeles has an average annual temperature of 63°F (17°C), with an average January minimum of 48°F (9°C) and an average July maximum of 75°F (24°C). San Francisco has an annual average of 57°F (14°C), with a January average minimum of 42°F (6°C) and a July average maximum of 72°F (22°C). The annual average in San Diego is 64°F (18°C), the January average minimum 49°F (9°C), and the July average maximum 76°F (24°C). Sacramento's annual average temperature is 61°F (16°C), with January minimums averaging 38°F (3°C) and July maximums of 93°F (34°C).

Annual precipitation varies from only 2 in (5 cm) in the Imperial Valley to 68 in (173 cm) at Blue Canyon, near Lake Tahoe. San Francisco had an average annual precipitation (1971–2000) of 20 in (51 cm), Sacramento 17.9 in (45.5 cm), Los Angeles 13.2 in (33.5 cm), and San Diego 10.8 in (27.4 cm). The largest one-month snowfall ever recorded in the U.S., 390 in (991 cm), fell in Alpine County in January 1911. Snow averages between 300 and 400 in (760 to 1,020 cm) annually in the high elevations of the Sierra Nevada, but is rare in the Central Valley and coastal lowlands.

Sacramento has the greatest percentage (73 percent) of possible annual sunshine among the State's largest cities; Los Angeles has 72 percent and San Francisco 71 percent. San Francisco is the windiest, with an average annual wind speed of 11 mph (18 km/hr). Tropical rainstorms occur often in California during the winter.

I. Hazards and Hazardous Materials

1. United States and Canada

Hazardous materials are substances with physical properties that could pose a substantial present or future hazard to human health or the environment when improperly handled, disposed, or otherwise managed. Hazardous materials are grouped into four categories based on their properties: toxic (causes human health effects), ignitable (has the ability to burn), corrosive (causes severe burns or damage to materials) and reactive (causes explosions or generates toxic gases). A hazardous waste is any hazardous material that cannot be safely disposed in the trash or poured down sinks and storm drains. This includes items, such as fuels, industrial solvents and chemicals, process water, and spent materials (e.g., foams).

2. California

California Health and Safety Code (Section 25501) defines "hazardous materials" as any material that, because of its quantity, concentration, or physical or chemical

characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. Hazardous materials are grouped into four categories based on their characteristics: toxic (causes human health effects), ignitable (has the ability to burn), corrosive (causes severe burns or damage to materials) and reactive (causes explosions or generates toxic gases). A hazardous waste is any hazardous material that is finished with its intended use and is discarded. This may include items, such as spent fuels, industrial solvents and chemicals, process water, and other spent materials (i.e., some types of batteries and fuel cells). California's hazardous waste regulations provides the following means to determine whether or not a waste is hazardous: (1) a list of criteria (toxic, ignitable, corrosive and reactive) that a waste may exhibit; (2) a list of those wastes that are subject to regulation; and (3) a list of chemical names and common names that are presumed to be hazardous in California. The California Hazardous Waste Control Law recognizes more than 780 hazardous chemicals and nearly 30 additional common materials that may be hazardous. Naturally occurring asbestos is also often found in a type of rock (serpentine) located in the California Coast Ranges and Sierra foothills.

J. Hydrology and Water Quality

1. United States and Canada

Surface waters occur as streams, lakes, ponds, coastal waters, lagoons, estuaries, floodplains, dry lakes, desert washes, wetlands and other collection sites. Water bodies modified or developed by man, including reservoirs and aqueducts, are also considered surface waters. Surface water resources are very diverse throughout the state, due to the high variance in tectonics, topography, geology/soils, climate, precipitation, and hydrologic conditions.

2. California

Land uses have a great effect on surface water and groundwater water quality in the State of California. Water quality degradation of surface waters occurs through nonpoint- and point- source discharges of pollutants. Nonpoint source pollution is defined as not having a discrete or discernible source and is generated from land runoff, precipitation, atmospheric deposition, seepage, and hydrologic modification (U.S. EPA 1993). Nonpoint-source pollution includes runoff containing pesticides, insecticides, and herbicides from agricultural areas and residential areas; acid drainage from inactive mines; bacteria and nutrients from septic systems and livestock; VOCs and toxic chemicals from urban runoff and industrial discharges; sediment from timber harvesting, poor road construction, improperly managed construction sites, and agricultural areas; and atmospheric deposition and hydromodification. In comparison, point-source pollution is generated from identifiable, confined, and discrete sources, such as a smokestack, sewer, pipe or culvert, or ditch. These pollutant sources are regulated by the U.S. EPA and the State Water Resources Control Board (SWRCB) through the Regional Water Quality Control Board (RWQCB). Many of the pollutants discharged from point-sources are the same as for nonpoint-sources, including municipal (bacteria

and nutrients), agricultural (pesticides, herbicides, and insecticides), and industrial pollutants (VOCs and other toxic effluent).

Overall, California has the most diverse range of watershed conditions in the U.S., with varied climatic regimes ranging from Mediterranean climates with temperate rainforests in the north coast region to desert climates containing dry desert washes and dry lakes in the southern central region. The average annual runoff for the State is 71 million acre-feet (DWR 2003). The state has more than 60 major stream drainages and more than 1,000 smaller, but significant drainages that drain coastal mountains and inland mountainous areas. High snowpack levels and resultant spring snowmelt yield high surface runoff and peak discharge in the Sierra Nevada and Cascade mountains that feed surface flows, fill reservoirs and recharge groundwater. Federal, state and local engineered water projects, aqueducts, canals, and reservoirs serve as the primary conduits of surface water sources to areas that have limited surface water resources. Most of the surface water storage is transported for agricultural, urban, and rural residential needs to the San Francisco Bay Area and to cities and areas extending to southern coastal California. Surface water is also transported to southern inland areas, including Owens Valley, Imperial Valley, and Central Valley areas.

The majority of runoff from snowmelt and rainfall flows down mountain streams into low gradient valleys and either percolates into the ground or is discharged to the sea. This percolating flow is stored in alluvial groundwater basins that cover approximately 40 percent of the geographic extent of the state (DWR 2003). Groundwater recharge occurs more readily in areas underlain by coarse sediments, primarily in mountain base alluvial fan settings. As a result, the majority of California's groundwater basins are located in broad alluvial valleys flanking mountain ranges, such as the Cascade Range, Coast Ranges, Transverse Ranges, and the Sierra Nevada.

There are 250 major groundwater basins that serve approximately 30 percent of California's urban, agricultural and industrial water needs, especially in southern portion of San Francisco Bay, the Central Valley, greater Los Angeles area, and inland desert areas where surface water is limited. On average, more than 15 million acre-feet of groundwater are extracted each year in the State, of which more than 50 percent is extracted from 36 groundwater basins in the Central Valley.

Land uses have a great effect on surface water and groundwater water quality in the State of California. Water quality degradation of surface waters occurs through nonpoint- and point- source discharges of pollutants. Nonpoint source pollution is defined as not having a discrete or discernible source and is generated from land runoff, precipitation, atmospheric deposition, seepage, and hydrologic modification (EPA 1993). Nonpoint-source pollution includes runoff containing pesticides, insecticides, and herbicides from agricultural areas and residential areas; acid drainage from inactive mines; bacteria and nutrients from septic systems and livestock; VOCs and toxic chemicals from urban runoff and industrial discharges; sediment from timber harvesting, poor road construction, improperly managed construction sites, and agricultural areas; and atmospheric deposition and hydromodification. In comparison, point-source pollution is generated from identifiable, confined, and discrete sources, such as a

smokestack, sewer, pipe or culvert, or ditch. These pollutant sources are regulated by the EPA and SWRCB through RWQCB. Many of the pollutants discharged from point-sources are the same as for nonpoint-sources, including municipal (bacteria and nutrients), agricultural (pesticides, herbicides, and insecticides), and industrial pollutants (VOCs and other toxic effluent).

K. Land Use and Planning

1. United States and Canada

The manner in which physical landscapes are used or developed is commonly referred to as land use. Public agencies are the primary entities that determine the types of land use changes that can occur for specific purposes within their authority or jurisdiction. In most states, land uses decisions are made by local governments.

2. California

In California, the State Planning and Zoning Law (California Government Code Section 65000 et seq.) provides the primary legal framework that cities and counties must follow in land use planning and controls. Planned land uses are designated in the city or county general plan, which serves as the comprehensive master plan for the community. Also, city and county land use and other related resource policies are defined in the General Plan. The primary land use regulatory tool provided by the California Planning and Zoning Law is the zoning ordinance adopted by each city and county. Planning and Zoning Law requirements are discussed in the regulatory setting below.

When approving land use development, cities and counties must comply with CEQA, which requires that they consider the significant environmental impacts of their actions and the adoption of all feasible mitigation measures to substantially reduce significant impacts, in the event a project causes significant or potentially significant effects on the environment. In some cases, building permits may be ministerial, and therefore exempt from CEQA, but most land use development approval actions by cities and counties require CEQA compliance.

Land use decisions in California are also be governed by state agencies such as the California Coastal Commission, California State Lands Commission, California Department of Parks and Recreation, and others, where the state has land ownership or permitting authority with respect to natural resources or other state interests.

L. Noise

1. United States, Canada, and California

a) Acoustic Fundamentals

Acoustics is the scientific study that evaluates perception, propagation, absorption, and reflection of sound waves. Sound is a mechanical form of radiant energy, transmitted by

a pressure wave through a solid, liquid, or gaseous medium. Sound that is loud, disagreeable, unexpected, or unwanted is generally defined as noise; consequently, the perception of sound is subjective in nature, and can vary substantially from person to person. Common sources of environmental noise and noise levels are presented in Table A1-4.

Table A1-4: Typical Noise Levels

Common Outdoor Activities	Noise Level (dB)	Common Indoor Activities
	110	Rock band
Jet flyover at 1,000 feet	100	--
Gas lawnmower at 3 feet	90	--
Diesel truck moving at 50 mph at 50 feet	80	Food blender at 3 feet, Garbage disposal at 3 feet
Noisy urban area, Gas lawnmower at 100 feet	70	Vacuum cleaner at 10 feet, Normal speech at 3 feet
Commercial area, Heavy traffic at 300 feet	60	
Quiet urban daytime	50	Large business office, Dishwasher in next room
Quiet urban nighttime	40	Theater, Large conference room (background)
Quiet suburban nighttime	30	Library, Bedroom at night, Concert hall (background)
Quiet rural nighttime	20	Broadcast/Recording Studio
	10	--
Threshold of Human Hearing	0	Threshold of Human Hearing
Notes: dB=A-weighted decibels; mph=miles per hour Source: Caltrans 2009.		

A sound wave is initiated in a medium by a vibrating object (e.g., vocal chords, the string of a guitar, the diaphragm of a radio speaker). The wave consists of minute variations in pressure, oscillating above and below the ambient atmospheric pressure. The number of pressure variation cycles occurring per second is referred to as the frequency of the sound wave and is expressed in hertz.

Directly measuring sound pressure fluctuations would require the use of a very large and cumbersome range of numbers. To avoid this and have a more useable numbering system, the decibel (dB) scale was introduced. A sound level expressed in decibels is the logarithmic ratio of two like pressure quantities, with one pressure quantity being a

reference sound pressure. For sound pressure in air the standard reference quantity is generally considered to be 20 micropascals, which directly corresponds to the threshold of human hearing. The use of the decibel is a convenient way to handle the million-fold range of sound pressures to which the human ear is sensitive. A decibel is logarithmic; it does not follow normal algebraic methods and cannot be directly added. For example, a 65 dB source of sound, such as a truck, when joined by another 65 dB source results in a sound amplitude of 68 dB, not 130 dB (i.e., doubling the source strength increases the sound pressure by 3 dB). A sound level increase of 10 dB corresponds to 10 times the acoustical energy, and an increase of 20 dB equates to a 100-fold increase in acoustical energy.

The loudness of sound perceived by the human ear depends primarily on the overall sound pressure level and frequency content of the sound source. The human ear is not equally sensitive to loudness at all frequencies in the audible spectrum. To better relate overall sound levels and loudness to human perception, frequency-dependent weighting networks were developed. The standard weighting networks are identified as A through E. There is a strong correlation between the way humans perceive sound and dBA. For this reason the dBA can be used to predict community response to noise from the environment, including noise from transportation and stationary sources. Sound levels expressed as dB in this section are A-weighted sound levels, unless noted otherwise.

Noise can be generated by a number of sources, including mobile sources (i.e., transportation noise sources) such as automobiles, trucks, and airplanes and stationary sources (i.e., non-transportation noise sources) such as construction sites, machinery, and commercial and industrial operations. As acoustic energy spreads through the atmosphere from the source to the receiver, noise levels attenuate (i.e., decrease) depending on ground absorption characteristics, atmospheric conditions, and the presence of physical barriers (walls, building façades, berms). Noise generated from mobile sources generally attenuate at a rate of 4.5 dB per doubling of distance. Stationary noise sources spread with more spherical dispersion patterns that attenuate at a rate of 6 to 7.5 dB per doubling of distance.

Atmospheric conditions such as wind speed, turbulence, temperature gradients, and humidity may additionally alter the propagation of noise and affect levels at a receiver. Furthermore, the presence of a large object (e.g., barrier, topographic features, and intervening building façades) between the source and the receptor can provide significant attenuation of noise levels at the receiver. The amount of noise level reduction, or “shielding,” provided by a barrier primarily depends on the size of the barrier, the location of the barrier in relation to the source and receivers, and the frequency spectra of the noise. Natural barriers such as berms, hills, or dense woods, and human-made features such as buildings and walls may be used as noise barriers.

All buildings provide some exterior-to-interior noise reduction. A building constructed with a wood frame and a stucco or wood sheathing exterior typically provides a minimum exterior-to-interior noise reduction of 25 dB with its windows closed, whereas a building constructed of a steel or concrete frame, a curtain wall or masonry exterior

wall, and fixed plate glass windows of one-quarter-inch thickness typically provides an exterior-to-interior noise reduction of 30–40 dB with its windows closed (Caltrans 2002).

b) Noise Descriptors

The intensity of environmental noise fluctuates over time, and several different descriptors of time-averaged noise levels are used. The selection of a proper noise descriptor for a specific source depends on the spatial and temporal distribution, duration, and fluctuation of both the noise source and the environment. The noise descriptors most often used to describe environmental noise are defined below (Caltrans 2009).

- **Equivalent Noise Level (L_{eq}):** The energy mean (average) noise level The Sacramento-San Joaquin Delta is sinking, putting levees at growing risk.
- **Maximum Noise Level (L_{max}):** The highest A/B/C weighted integrated noise level occurring during a specific period of time.
- **Minimum Noise Level (L_{min}):** The lowest A/B/C weighted integrated noise level during a specific period of time.
- **Day-Night Noise Level (L_{dn}):** The 24-hour L_{eq} with a 10-dB "penalty" applied during nighttime noise-sensitive hours, 10 p.m. through 7 a.m.
- **Community Noise Equivalent Level (CNEL):** Similar to the L_{dn} described above, but with an additional 5-dB "penalty" for the noise-sensitive hours between 7 p.m. to 10 p.m., which are typically reserved for relaxation, conversation, reading, and watching television.

Community noise is commonly described in terms of the ambient noise level, which is defined as the all-encompassing noise level associated with a given noise environment. A common statistical tool to measure the ambient noise level is the L_{eq} descriptor listed above, which corresponds to a steady-state A-weighted sound level containing the same total energy as a time-varying signal over a given time period (usually one hour). The L_{eq} is the foundation of the composite noise descriptors such as L_{dn} and CNEL, as defined above, and shows very good correlation with community response to noise.

c) Effects of Noise on Humans

Excessive and chronic exposure to elevated noise levels can result in auditory and non-auditory effects on humans. Auditory effects of noise on people are those related to temporary or permanent hearing loss caused by loud noises. Non-auditory effects of exposure to elevated noise levels are those related to behavioral and physiological effects. The non-auditory behavioral effects of noise on humans are associated primarily with the subjective effects of annoyance, nuisance, and dissatisfaction, which lead to interference with activities such as communications, sleep, and learning. The non-auditory physiological health effects of noise on humans have been the subject of considerable research attempting to discover correlations between exposure to elevated noise levels and health problems, such as hypertension and cardiovascular disease.

The mass of research infers that noise-related health issues are predominantly the result of behavioral stressors and not a direct noise-induced response. The extent to which noise contributes to non-auditory health effects remains a subject of considerable research, with no definitive conclusions.

The degree to which noise results in annoyance and interference is highly subjective and may be influenced by several non-acoustic factors. The number and effect of these non-acoustic environmental and physical factors vary depending on individual characteristics of the noise environment such as sensitivity, level of activity, location, time of day, and length of exposure. One key aspect in the prediction of human response to new noise environments is the individual level of adaptation to an existing noise environment. The greater the change in the noise levels that are attributed to a new noise source, relative to the environment an individual has become accustom to, the less tolerable the new noise source will be perceived.

With respect to how humans perceive and react to changes in noise levels, a 1 dB increase is imperceptible, a 3 dB increase is barely perceptible, a 6 dB increase is clearly noticeable, and a 10 dB increase is subjectively perceived as approximately twice as loud (Egan 2007). These subjective reactions to changes in noise levels was developed on the basis of test subjects' reactions to changes in the levels of steady-state pure tones or broad-band noise and to changes in levels of a given noise source. It is probably most applicable to noise levels in the range of 50 to 70 dB, as this is the usual range of voice and interior noise levels. For these reasons, a noise level increase of 3 dB or more is typically considered substantial in terms of the degradation of the existing noise environment.

Negative effects of noise exposure include physical damage to the human auditory system, interference, and disease. Exposure to noise may result in physical damage to the auditory system, which may lead to gradual or traumatic hearing loss. Gradual hearing loss is caused by sustained exposure to moderately high noise levels over a period of time; traumatic hearing loss is caused by sudden exposure to extremely high noise levels over a short period. Gradual and traumatic hearing loss both may result in permanent hearing damage. In addition, noise may interfere with or interrupt sleep, relaxation, recreation, and communication. Although most interference may be classified as annoying, the inability to hear a warning signal may be considered dangerous. Noise may also be a contributor to diseases associated with stress, such as hypertension, anxiety, and heart disease. The degree to which noise contributes to such diseases depends on the frequency, bandwidth, and level of the noise, and the exposure time (Caltrans 2009).

d) Vibration

Vibration is the periodic oscillation of a medium or object with respect to a given reference point. Sources of vibration include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) and those introduced by human activity (e.g., explosions, machinery, traffic, trains, construction equipment). Vibration sources may be continuous, (e.g., operating factory machinery or transient in nature, explosions).

Vibration levels can be depicted in terms of amplitude and frequency, relative to displacement, velocity, or acceleration.

Vibration amplitudes are commonly expressed in peak particle velocity (PPV) or root-mean-square (RMS) vibration velocity. PPV is defined as the maximum instantaneous positive or negative peak of a vibration signal. PPV is typically used in the monitoring of transient and impact vibration and has been found to correlate well to the stresses experienced by buildings (FTA 2006, Caltrans 2004). PPV and RMS vibration velocity are normally described in inches per second (in/sec).

Although PPV is appropriate for evaluating the potential for building damage, it is not always suitable for evaluating human response. The response of the human body to vibration relates well to average vibration amplitude; therefore, vibration impacts on humans are evaluated in terms of RMS vibration velocity. Similar to airborne sound, vibration velocity can be expressed in decibel notation as VdB. The logarithmic nature of the decibel serves to compress the broad range of numbers required to describe vibration.

The typical background vibration-velocity level in residential areas is approximately 50 VdB. Groundborne vibration is normally perceptible to humans at approximately 65 VdB. For most people, a vibration-velocity level of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels (FTA 2006).

Typical outdoor sources of perceptible groundborne vibration include construction equipment, steel-wheeled trains, and traffic on rough roads. Although the effects of vibration may be imperceptible at low levels, effects may result in detectable vibrations and slight damage to nearby structures at moderate and high levels, respectively. At the highest levels of vibration, damage to structures is primarily architectural (e.g., loosening and cracking of plaster or stucco coatings) and rarely results in damage to structural components. The range of vibration that is relevant to this analysis occurs from approximately 50 VdB, which is the typical background vibration-velocity level, to 100 VdB, which is the general threshold where minor damage can occur in fragile buildings. Construction activities could generate groundborne vibrations that potentially pose a risk to nearby structures. Constant or transient vibrations can weaken structures, crack facades, and disturb occupants (FTA 2006).

Construction vibrations can be transient, random, or continuous. Transient construction vibrations are generated by blasting, impact pile driving, and wrecking balls. Continuous vibrations result from vibratory pile drivers, large pumps, and compressors. Random vibration can result from jackhammers, pavement breakers, and heavy construction equipment. Table A1-5 describes the general human response to different levels of groundborne vibration-velocity levels.

Table A1-5: Human Response to Different Levels of Groundborne Noise and Vibration

Vibration-Velocity Level	Human Reaction
65 VdB	Approximate threshold of perception.
75 VdB	Approximate dividing line between barely perceptible and distinctly perceptible. Many people find that transportation-related vibration at this level is unacceptable.
85 VdB	Vibration acceptable only if there are an infrequent number of events per day.

Notes: VdB = vibration decibels referenced to 1 μ inch/second and based on the root mean square (RMS) velocity amplitude.
Source: FTA 2006.

e) Existing Sources and Sensitive Land Uses

The existing noise environment in the project area is primarily influenced by transportation noise from vehicle traffic on the roadway systems (e.g., highways, freeways, primary arterials, and major local streets) and non-transportation noise from commercial and industrial operations. Other noise sources that contribute to the existing noise environment include passenger and Sustainable Freight Strategies on-line railroad operations and ground rapid transit systems; commercial, general aviation, heliport, and military airport operations (e.g., jet engine test stands, ground facilities and maintenance) and overflights; and to a much lesser extent construction sites, schools (e.g., play fields), residential and recreational areas (e.g., landscape maintenance activities, dogs barking, people talking), agricultural activities, and others. Those noted above are also considered sources of vibration in the project area. With regards to the covered entities, existing noise conditions vary depending on location, but are typically characterized as noisy urban industrial areas including such noise sources as stationary machinery, transportation (e.g., surface vehicles, heavy-duty diesel trucks, construction equipment), and other industrial-related activities. Noise-sensitive land uses are generally considered to include those uses where noise exposure could result in health-related risks to individuals, as well as places where quiet is an essential element of their intended purpose. Residential dwellings are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels. Additional land uses such as parks, historic sites, cemeteries, and recreation areas are also generally considered sensitive to increases in exterior noise levels. Places of worship and transit lodging, and other places where low interior noise levels are essential are also considered noise-sensitive.

Those noted above are also considered vibration-sensitive land uses in addition to commercial and industrial buildings where vibration would interfere with operations within the building, including levels that may be well below those associated with human annoyance. Equipment such as electron microscopes and high-resolution lithographic equipment can be very sensitive to vibration, and even normal optical microscopes will

sometimes be difficult to use when vibration is well below the human annoyance level. Manufacturing of computer chips is an example of a vibration-sensitive process. This category does not include most computer installations or telephone switching equipment because most such equipment is designed to operate in typical building environments where the equipment may experience occasional shock from bumping and continuous background vibration caused by other equipment (FTA 2006).

M. Population and Housing

1. United States

The employed civilian labor force, unemployment rates, employment opportunities, and population estimates and projections for cities, counties, and states are collected every ten years by the U.S. Census Bureau (Census). As of July 1, 2015, the U.S. population was approximately 321 million, who live in approximately 134 million housing units. (Census 2016).

2. California

a) Population

The estimated population of California in 2015 was estimated to be approximately 39,256,000 (DOF 2016). Since California became a state in 1850, the population has been increasing rapidly. Within the first 150 years of California's statehood, the population increased from fewer than 100,000 citizens to approximately 37 million in 2000 (DOF 2013). It is expected that the population of California will reach approximately 44 million in 2030 and approximately 52 million in 2060 (DOF 2014).

b) Housing

As population within the state increases, housing distribution and household conditions are expected to evolve. Estimated housing units, households, and vacancy rates for the State of California in 2013 are shown below in Table A1-6. Data was derived from the 2010 Census (Census 2014).

Table A1-6: California Housing Profile

Housing units, 2014	13,900,766
Homeownership rate, 2009-2013	55.3 percent
Households, 2009-2013	12,542,460
Persons per Household, 2009-2013	2.94
Housing units in Multi-units structures, 2009-2013	31 percent
Source: U.S. Census 2014	

c) Employment

In mid-2015, the civilian labor force in California was approximately 19,043,000. Of this labor force, approximately 17,484,000 people were employed and 1,195,000 were considered unemployed. The number of and the unemployment rate decreased steadily decreased in 2015 from 7.0 percent in January to 6.3 percent in June (DOF 2015).

3. Canada

The Canada Census Program provides a statistical portrait of the country every five years. The last census was conducted in May 2011 and consisted of the Census of Agriculture, the Census of Population, and the 2011 National Household Survey. In 2015, the total population of Canada was approximately 36 million people (Statcan 2015).

N. Public Services

1. United States

In the U.S., the Federal Bureau of Investigation (FBI) is an agency of the U.S. Department of Justice that serves as both a federal criminal investigative body and an internal intelligence agency. The FBI's main goal is to protect and defend the U.S. against terrorist and foreign intelligence threats, to uphold and enforce the criminal laws of the U.S., and to provide leadership and criminal justice services to federal, state, municipal, and international agencies and partners. The U.S. EPA is an agency of the federal government of the U.S. charged with protecting human health and the environment, by writing and enforcing regulations based on laws passed by Congress. The U.S. EPA's Criminal Investigation Division primary mission is the enforcement of the U.S.' environmental laws as well as any other federal law in accordance with the guidelines established by the Attorney General of the U.S. (18 United States Code [U.S.C.] 3063). These environmental laws include those specifically related to air, water and land resources.

The U.S. Forest Service is an agency of the USDA that administers the nation's 155 national forests and 20 national grasslands, which encompass 193 million acres (780,000 km2). Major divisions of the agency include the National Forest System, State and Private Forestry, and the Research and Development branch. The Fire and Aviation Management part of the U.S. Forest Service works to advance technologies in fire management and suppression, maintain and improve the extremely efficient mobilization and tracking systems in place, and reach out in support of our Federal, State, and International fire partners.

2. California

a) Law Enforcement

Enforcement of environmental laws in California is the responsibility of the Attorney General's Office and the CalEPA. The Attorney General represents the people of California in civil and criminal matters before trial courts, appellate courts and the

supreme courts of California and the U.S. In regards to environmental issues, the Attorney General enforces laws that safeguard the environment and natural resources in the state. Recent actions by the Attorney General related to air quality and climate change issues include: legally defending the state's clean cars law against multiple challenges, filing numerous actions against the Bush Administration regarding regulation of global warming pollution, working with local governments to ensure that land use planning processes take account of global warming, promoting renewable energy and enhanced energy efficiency in California, and working with other state leaders and agencies to implement AB 32, the Global Warming Solutions Act of 2006.

CalEPA was created in 1991 by Governor's Executive Order. CalEPA's mission is to restore, protect and enhance the environment, to ensure public health, environmental quality and economic vitality. The CalEPA is comprised of various boards, departments and offices, including: CARB, Department of Pesticide Regulation, DTSC, Office of Environmental Health Hazard Assessment, and SWRCB (including the nine RWQCBs).

California's environmental laws are enforced by state and local agencies, each charged with enforcing the laws governing a specific media such as air, water, hazardous waste, solid waste, and pesticides. Enforcement agencies for these media are as follows:

- Air: CARB (part of CalEPA) and Local Air Districts.
- Water: SWRCB (part of CalEPA), RWQCBs (part of CalEPA), local waste water officials, and the California Department of Public Health.
- Hazardous Waste: DTSC (part of CalEPA) and CUPA.
- Carcinogens/Reproductive Toxins: Prop. 65 through the Office of Environmental Health Hazard Assessment (part of CalEPA).
- Pesticides: Department of Pesticide Regulation (part of CalEPA) and County Agricultural Commissioners

Statewide law enforcement service is provided by the California Highway Patrol, which is responsible for protecting State resources and providing crime prevention services and traffic enforcement along the State's highways and byways.

Community law enforcement service is provided by local police and sheriff agencies (i.e., cities and counties, respectively) to prevent crime, respond to emergency incidents, and provide traffic enforcement on local roadways.

b) Fire Protection and Emergency Medical Response Services

State-level fire protection and emergency response service is provided by the California Department of Forestry and Fire Protection (CAL FIRE), primarily in rural areas of the State. CAL FIRE is an emergency response and resource protection department. CAL FIRE protects lives, property and natural resources from fire, responds to

emergencies of all types, and protects and preserves timberlands, wildlands, and urban forests.

Local and urban fire protection service is provided by local fire districts and/or local agencies (e.g., fire departments of cities and counties). In addition to providing fire response services most fire agencies also provide emergency medical response services (i.e., ambulance services) within their service areas.

c) Schools

Statewide, the regulation of education for youth is provided by the California Department of Education. The State Board of Education (SBE) is the governing and policy-making body of the California Department of Education. The SBE sets K-12 education policy in the areas of standards, instructional materials, assessment, and accountability. Locally, school districts are responsible for the management and development of elementary, middle, and high-school facilities.

3. Canada

The Royal Canadian Mounted Police (RCMP) is Canada's federal police agency. The RCMP's mandate, as outlined in Section 18 of the Royal Canadian Mounted Police Act, is multi-faceted. It includes preventing and investigating crime; maintaining peace and order; enforcing laws; contributing to national security; ensuring the safety of state officials, visiting dignitaries and foreign missions; and providing vital operational support services to other police and law enforcement agencies within Canada and abroad (RCMP 2016).

Canada's forests and wildlands are largely under public ownership, and wildland fire management is therefore carried out mainly by government agencies acting in the public interest and paid for with public funds. Provincial governments have title to most of the forest and other wildland regions in Canada and thus have had responsibility for fire management on provincial crown lands since Confederation.

O. Recreation

1. United States and Canada

Recreational resources and facilities are provided and managed at federal, state, and local levels. Recreation resources include national parks and monuments, national forests and grasslands, wildlife refuges, wilderness areas, lakes and lands managed by different agencies in the federal government, wild and scenic rivers, and back country byways, national trials, and marine reserves and estuaries.

2. California

California contains 118 state parks, nine state recreation areas, eight state forests, as well as numerous reserve, wildlife areas, and fish hatcheries. General plans for State parks, recreation areas, and beaches are publicly available. The California Outdoor

Recreation Plan and associated research provide policy guidance to all public agencies – federal, state, local, and special districts that oversee outdoor recreation on lands, facilities and services throughout California. Agencies and departments that have involvement in recreational activities include Boating and Waterways, Fish and Wildlife, Tahoe Regional Planning Association, various conservancies, and others (California State Parks 2008).

Recreational lands and facilities are also managed by regional and local park and recreation agencies and open space districts. City and county general plans contain recreation elements that provide framework for planning agencies to consider when projects are developed and implemented.

P. Transportation and Traffic

1. United States, Canada, and California

Existing roadway systems in-state and in out-of-state areas generally consist of highways, freeways, arterials, local streets, and intersections/ramps. The existing average annual daily traffic (AADT) volumes on the roadway segments that comprise these systems vary considerably (i.e., from hundreds to hundreds of thousands). The level of service (LOS), a scale used to determine the operating quality of a roadway segment or intersection based on volume-to-capacity ratio (V/C) or average delay, also vary from LOS A, the best and smoothest operating conditions, to LOS F, most congested operating conditions. Other roadway and traffic volume characteristics such as roadway length, number of lanes and facility type (e.g., two-lane freeway), right-of-way width and pavement width, terrain classification (e.g., flat), percent of heavy-duty truck traffic, and accident rates (e.g., number of accidents per million vehicle miles traveled) also vary substantially depending on the location. In addition to the roadway systems, circulation networks provide additional transportation opportunities and include mass transit, airports, and non-motorized travel (e.g., pedestrian and bicycle paths).

Q. Utilities and Service Systems

1. United States and Canada

Utilities and services systems include water supplies, wastewater treatment facilities, electric and gas supplies, and solid waste collection and disposal. These services are typically provided through regional or local companies and agencies.

The U.S. Bureau of Reclamation (USBR) is a federal agency and it is the largest wholesaler of water in the U.S. and the second largest producer of hydroelectric power (USBR 2011). The Federal Power Commission regulates both the interstate transmission of electricity and the sale of hydroelectric power at the wholesale level in the U.S., and the Federal Energy Regulatory Commission (FERC) has authority over intrastate as well as interstate natural gas production.

2. California

a) Water Supply and Distribution

The principal water supply facilities in California are operated by the USBR and DWR. In California, the Mid-Pacific Region of the USBR is responsible for the management of the Central Valley Project (CVP). The CVP serves farms, homes, and industry in California's Central Valley as well as the major urban centers in the San Francisco Bay Area. The CVP consists of 20 dams and reservoirs, 11 power plants, and 500 miles of major canals and reaches from the Cascade Mountains near Redding in the north to the Tehachapi Mountains near Bakersfield in the south. In addition to delivering water for municipal and industrial uses and the environment, the CVP produces electric power and provides flood protection, navigation, recreation, and water quality benefits (USBR 2011).

DWR is a State agency that is responsible for managing and implementing the State Water Project (SWP). The SWP is a water storage and delivery system of reservoirs, aqueducts, power plants and pumping plants. Its main purpose is to store water and distribute it to 29 urban and agricultural water suppliers in Northern California, the San Francisco Bay Area, the San Joaquin Valley, the Central Coast, and Southern California (DWR 2010).

Local water districts, irrigation districts, special districts, and jurisdictions (e.g., cities and counties) manage and regulate the availability of water supplies and the treatment and delivery of water to individual projects. Depending on their location and the source of their supplies, these agencies may use groundwater, surface water through specific water entitlements, or surface water delivered through the CVP or SWP. In some remote areas not served by a water supply agency, individual developments may need to rely upon the underlying groundwater basin for their water supply. In these cases, the project would be required to secure a permit from the local or state land use authority and seek approval for development of the groundwater well(s).

b) Wastewater Collection and Treatment

The SWRCB is the state agency responsible for the regulation of wastewater discharges to surface waters and groundwater via land discharge. The SWRCB and nine RWQCBs are responsible for development and enforcement of water quality objectives and implementation plans that protect the beneficial uses of the federal and state waters. The SWRCB also administers water rights in California. The RWQCB's are responsible for issuing permits or other discharge requirements to individual wastewater dischargers and for ensuring that they are meeting the requirements of the permit through monitoring and other controls.

Wastewater collection, treatment, and discharge service for developed and metropolitan areas is typically provided by local wastewater service districts or agencies that may or may not be operated by the local jurisdiction (e.g., city or county). These agencies are required to secure treatment and discharge permits for the operation of a wastewater facility from the RWQCB. Wastewater is typically collected from a specific development

and conveyed through a series of large pipelines to the treatment facility where it is treated to permitted levels and discharged to surface waters or the land.

In areas that are remote or that are not served by an individual wastewater service provider, developments would be required to install an individual septic tank or other on-site wastewater treatment system. These facilities would need to be approved by the local or state land use authority and the RWQCB.

c) Electricity and Natural Gas

The CPUC regulates investor-owned electric and natural gas companies located within California. The CPUC's Energy Division develops and administers energy policy and programs and monitors compliance with the adopted regulations. One-third of California's electricity and natural gas is provided by one of three companies: Pacific Gas and Electric Company, Southern California Edison, San Diego Gas and Electric Company (CPUC 2010).

Locally, energy service is provided by a public or private utility. New development projects would need to coordinate with the local service provider to ensure adequate capacity is available to serve the development.

d) Solid Waste Collection and Disposal

Statewide, the California Department of Resources Recycling and Recovery (CalRecycle), which is a department of the CalEPA, is responsible for the regulation of the disposal and recycling of all solid waste generated in California. CalRecycle acts as an enforcement agency in the approval and regulation of solid waste disposal and recycling facilities. Local agencies can create local enforcement agencies and, once approved by CalRecycle, they can serve as the enforcement agency for landfills and recycling facilities with their jurisdictions.

Local agencies or private companies own and operate landfill facilities and solid waste is typically hauled to these facilities by private or public haulers. Individual projects would need to coordinate with the local service provider and landfill to determine if adequate capacity exists to serve the project.

REGULATORY SETTING

A. United States, State of California, and Local Regulatory Setting

3. Aesthetics

Applicable laws and regulations associated with aesthetics and scenic resources are discussed in Table A2-1.

Table A2-1: Applicable Laws and Regulations for Aesthetic Resources

Applicable Regulations	Description
Federal	

Table A2-1: Applicable Laws and Regulations for Aesthetic Resources

Applicable Regulations	Description
Federal Land Policy and Management Act of 1976 (FLPMA)	FLPMA is the enabling legislation establishing the Bureau of Land Management's (BLM's) responsibilities for lands under its jurisdiction. Section 102 (a) of the FLPMA states that "…the public lands be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resources, and archeological values…" Section 103(c) identifies "scenic values" as one of the resources for which public land should be managed.
BLM Contrast Rating System	The contrast rating system is a systematic process used by BLM to analyze visual impacts of proposed projects and activities. It is primarily intended to assist BLM personnel in the resolution of visual impact assessment.
Natural Historic Preservation Act (NHPA)	Under regulations of the NHPA, visual impacts to a listed or eligible National Register property that may diminish the integrity of the property's "setting … [or] … feeling" in a way that affects the property's eligibility for listing may result in a potentially significant adverse effect. "Examples of adverse effects … include…: Introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features." (Title 36 Code of Federal Regulations CFR (CFR) Part 800.5)
National Scenic Byways Program	Title 23, Sec 162 outlines the National Scenic Byways Program. This program is used to recognize roads having outstanding scenic, historic, cultural, natural, recreational, and archaeological qualities through designation of road as: National Scenic Byways; All-American Roads; or America's Byways. Designation of the byways provides eligibility for Federal assistance for safety improvement, corridor management plans, recreation access, or other project that protect scenic, historical, recreational, cultural, natural, and archaeological resources.
State	
Ambient Air Quality Standard for Visibility-Reducing Particles	Extinction coefficient (measure of absorption of light in a medium) of 0.23 per kilometer — visibility of 10 miles or more (0.07 — 30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 percent.
California Streets and Highway Code, Section 260 through 263 – Scenic Highways	The State Scenic Highway Program promotes protection of designated State scenic highways through certification and adoption of local scenic corridor protection programs that conform to requirements of the California Scenic Highway Program.

Table A2-1: Applicable Laws and Regulations for Aesthetic Resources

Applicable Regulations	Description
Local	
County and City Controls	Most local planning guidelines to preserve and enhance the visual quality and aesthetic resources of urban and natural areas are established in the jurisdiction's general plan. The value attributed to a visual resource generally is based on the characteristics and distinctiveness of the resource and the number of persons who view it. Vistas of undisturbed natural areas, unique or unusual features forming an important or dominant portion of a viewshed, and distant vistas offering relief from less attractive nearby features are frequently considered to be scenic resources. In some instances, a case-by-case determination of scenic value may be needed, but often there is agreement within the relevant community about which features are valued as scenic resources. In addition to Federal and State designations, counties and cities have their own scenic highway designations, which are intended to preserve and enhance existing scenic resources. Criteria for designation are commonly included in the conservation/open space element of the city or county general plan.

4. Agricultural and Forest Resources

Table A2-2 below provides a general description of applicable laws and regulations that may pertain to agriculture and forest resources.

Table A2-2: Applicable Laws and Regulations for Agriculture and Forest Resources

Applicable Regulations	Description
Federal	
Farmland Protection Policy Act (FPPA)	FPPA directs federal agencies to consider the effects of federal programs or activities on farmland, and ensure that such programs, to the extent practicable, are compatible with state, local, and private farmland protection programs and policies. The rating process established under the FPPA was developed to help assess options for land use on an evaluation of productivity weighed against commitment to urban development.
National Forest Management Act (NFMA) of 1976	NFMA is the primary statute governing the administration of national forests. The act requires the Secretary of Agriculture to assess forest lands, develop a management program based on multiple-use, sustained-yield principles, and implement a

Table A2-2: Applicable Laws and Regulations for Agriculture and Forest Resources	
Applicable Regulations	**Description**
	resource management plan for each unit of the National Forest System. Goal 4 of the U.S. Forest Service's National Strategic Plan for the National Forests states that the nation's forests and grasslands play a significant role in meeting America's need for producing and transmitting energy. Unless otherwise restricted, National Forest Service lands are available for energy exploration, development, and infrastructure (e.g., well sites, pipelines, and transmission lines). However, the emphasis on non-recreational special uses, such as utility corridors, is to authorize the special uses only when they cannot be reasonably accommodated on non-National Forest Service lands.
State	
The California Land Conservation Act, also known as the Williamson Act (Government Code Section 51200)	The DOC's Division of Land Resource Protection administers the Williamson Act program, which permits property tax adjustments for landowners who contract with a city or county to keep their land in agricultural production or approved open space uses for at least 10 years. Lands covered by Williamson Act contracts are assessed on the basis of their agricultural value instead of their potential market value under nonagricultural uses. In return for the preferential tax rate, the landowner is required to contractually agree to not develop the land for a period of at least 10 years. Williamson Act contracts are renewed annually for 10 years unless a party to the contract files for nonrenewal. The filing of a non-renewal application by a landowner ends the automatic annual extension of a contract and starts a 9-year phase-out of the contract. During the phase-out period, the land remains restricted to agricultural and open-space uses, but property taxes gradually return to levels associated with the market value of the land. At the end of the 9-year non-renewal process, the contract expires and the owner's uses of the land are restricted only by applicable local zoning. The Williamson Act defines compatible use of contracted lands as any use determined by the county or city administering the agricultural preserve to be compatible with the agricultural, recreational, or open space use of land within the preserve and subject to contract (Government Code, Section 51202[e]). However, uses deemed compatible by a county or city government must be consistent with the principles of compatibility set forth in Government Code, Section 51238.1. Approximately 16 million acres of farmland (about 50 percent of the State's total farmland) are enrolled in the program.
California Farmland Conservancy Program	The program provides grant funding for agricultural conservation easements. Although the easements are always

Table A2-2: Applicable Laws and Regulations for Agriculture and Forest Resources	
Applicable Regulations	**Description**
(CFCP) (PRC Section 10200)	written to reflect the benefits of multiple resource values, there is a provision in the CFCP statute that prevents easements funded under the program from restricting husbandry practices. This provision could prevent restricting those practices to benefit other natural resources.
Farmland Mapping and Monitoring Program (FMMP) (Government Code Section 65570, PRC Section 612)	Under the FMMP, the DOC assesses the location, quality, and quantity of agricultural lands and conversion of these lands over time. Agricultural designations include the categories of Prime Farmland, Farmland of Statewide Importance, Unique Farmland, Farmland of Local Importance, Grazing Land, Urban and Built-Up Land, and Other Land. FMMP uses the following definitions to describe farmland types. Prime Farmland is defined by the DOC as “Land with the best combination of physical and chemical features able to sustain long term production of agricultural crops. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. Land must have been used for production of irrigated crops at some time during the past four years.” Farmland of Statewide Importance is defined by the DOC as “Land similar to Prime Farmland that has a good combination of physical and chemical characteristics for the production of agricultural crops. This land has minor shortcomings, such as greater slopes or less ability to store soil moisture than Prime Farmland. Land must have been used for production of irrigated crops at some time during the past four years.” Unique Farmland is defined by the DOC as “Lesser quality soils used for the production of the State’s leading agricultural crops. This land is usually irrigated, but may include non-irrigated orchards or vineyard as found in some climatic zones in California.”
State Lands Commission Significant Land Inventory	The State Lands Commission is responsible for managing lands owned by the State, including lands that the State has received from the federal government. These lands total more than 4 million acres and include tide and submerged lands, swamp and overflow lands, the beds of navigable waterways, and State School Lands. The State Lands Commission has a legal responsibility for, and a strong interest in, protecting the ecological and Public Trust values associated with the State’s sovereign lands, including the use of these lands for habitat preservation, open space and recreation. Scoping Plan

Table A2-2: Applicable Laws and Regulations for Agriculture and Forest Resources	
Applicable Regulations	**Description**
	projects located within these lands would be subject to the State Lands Commission permitting process.
Local	
Open Space Element	State law requires each city and county to adopt a general plan containing at least seven mandatory elements including an open space element. The open space element identifies open space resources in the community and strategies for protection and preservation of these resources. Agricultural and forested lands are among the land use types identified as open space in general plans.
Zoning	The city or county zoning code is the set of detailed requirements that implement the general plan policies at the level of the individual parcel. The zoning code presents standards for different land uses and identifies which land uses (e.g., agriculture, residential, commercial, industrial) are allowed in the various zoning districts of the jurisdiction. Since 1971, state law has required the city or county zoning code to be consistent with the jurisdiction's general plan, except in charter cities.

5. Air Quality

Applicable laws and regulations associated with air quality are discussed in Table A2-3.

Table A2-3: Applicable Laws and Regulations for Air Quality

Regulation	Description
Federal	
Clean Air Act (CAA) (40 CFR)	CAA, which was last amended in 1990, requires the U.S. EPA to set NAAQS for pollutants considered harmful to public health and the environment. CAA established two types of NAAQS: primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly; and secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings. U.S. EPA Office of Air Quality Planning and Standards has set NAAQS for six principal pollutants, which are called "criteria" pollutants. Title III of the CAA directed the U.S. EPA to promulgate national emissions standards for Hazardous Air Pollutants. The CAA also required the U.S. EPA to promulgate vehicle or fuel standards containing reasonable requirements that control toxic emissions, at a minimum to benzene and formaldehyde. Performance

Table A2-3: Applicable Laws and Regulations for Air Quality

Regulation	Description
	criteria were established to limit mobile-source emissions of toxics, including benzene, formaldehyde, and 1,3-butadiene. In addition, Section 219 required the use of reformulated gasoline in selected areas with the most severe ozone nonattainment conditions to further reduce mobile-source emissions.
SmartWay	SmartWay is an U.S. EPA program that reduces transportation-related emissions by creating incentives to improve supply chain fuel efficiency. It aims to increase the availability and market penetration of fuel efficient technologies and strategies that help freight companies save money while also reducing adverse environmental impacts.
Other Applicable Federal-Level Regulations	This includes all other applicable regulations at the federal level for portions of the project area that are outside of the U.S. (e.g., Canada).
State	
California Clean Air Act (CCAA) CCR (Titles 13 and 17)	CARB is the agency responsible for coordination and oversight of State and local air pollution control programs in California and for implementing the CCAA. The CCAA, which was adopted in 1988, required the CARB to establish California ambient air quality standards.
Waste Heat and Carbon Emissions Reduction Act	This Act is designed to encourage the development of new combined heat and power (CHP) systems in California with a generating capacity of not more than 20 megawatts. Section 2843 of the Act provides that the Energy Commission's guidelines require that CHP systems: be designed to reduce waste energy; have a minimum efficiency of 60 percent; have NO_X emissions of no more than 0.07 pounds per megawatt-hour; be sized to meet the eligible customer generation thermal load; operate continuously in a manner that meets the expected thermal load and optimizes the efficient use of waste heat; be cost effective, technologically feasible, and environmentally beneficial.
Other Applicable State-Level Regulations	This includes all other applicable regulations at the State level for portions of the project area that are outside of California (e.g., AB 1807 and AB 2588).
Local	
Air Districts	Air Districts have primary responsibility for preparation, adoption, and implementation of mobile, stationary, and area emission control measures and for the preparation of the SIP and any amendments.

6. Biological Resources

Applicable laws and regulations associated with biological resources are discussed in Table A2-4.

Table A2-4: Applicable Laws and Regulations for Biological Resources

Applicable Law	Description
Federal	
Federal Endangered Species Act (ESA)	Designates and provides for protection of threatened and endangered plant and animal species, and their critical habitat. Two sections of the ESA address take of threatened and endangered species. Section 7 covers actions that would result in take of a federally-listed species and have a federal discretionary action. Section 10 regulates actions that would result in take of threatened or endangered species and a non-federal agency is the lead agency for the action. Section 10 of the ESA requires preparation of a habitat conservation plan (HCP). More than 430 HCPs have been approved nation-wide.
Migratory Bird Treaty Act	Makes it unlawful to take or possess any migratory nongame bird (or any part of such migratory nongame bird) as designated in the Migratory Bird Treaty Act.
Clean Water Act (CWA)	Requires the permitting and monitoring of all discharges to surface water bodies. Section 404 requires a permit from the U.S. Army Corps of Engineers (USACE) for a discharge from dredged or fill materials into Waters of the U.S., including wetlands. Section 401 requires a permit from a RWQCB for the discharge of pollutants. By federal law, every applicant for a federal permit or license for an activity that may result in a discharge into a California water body, including wetlands, must request State certification that the proposed activity would not violate State and federal water quality standards.
Rivers and Harbors Act of 1899	Requires permit or letter of permission from USACE prior to any work being completed within navigable waters.
U.S. EPA Section 404 (b)(1) Guidelines	Requires USACE to analyze alternatives in a sequential approach such that USACE must first consider avoidance and minimization of impacts to the extent practicable to determine whether a proposed discharge can be authorized.
California Desert Conservation Area Plan (CDCA)	Comprises one of two national conservation areas established by Congress in 1976. FLPMA outlines how BLM would manage public lands. Congress specifically provided guidance for the management of the CDCA and directed the development of the 1980 CDCA Plan.
Federal Noxious Weed Act of 1974 (Public Law	Establishes a federal program to control the spread of noxious weeds. Authority is given to the Secretary of

Table A2-4: Applicable Laws and Regulations for Biological Resources

Applicable Law	Description
[P.L.] 93-629) (7 U.S.C. 2801 et seq.; 88 Stat. 2148)	Agriculture to designate plants as noxious weeds by regulation, and the movement of all such weeds in interstate or foreign commerce was prohibited except under permit.
Executive Order 13112, "Invasive Species," February 3, 1999	Federal agencies are mandated to take actions to prevent the introduction of invasive species, provide for their control, and minimize the economic, ecological, and human health impacts that invasive species cause.
Executive Order 11988, "Floodplain Management," May 24, 1977	Requires federal agencies to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of flood plains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative.
Executive Order 11990, "Protection of Wetlands," May 24, 1977	Requires all federal agencies to consider wetland protection as an important part of their policies and take action to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands.
Executive Order 13186, "Responsibilities of Federal Agencies to Protect Migratory Birds," January 10, 2001	Requires that each federal agency taking actions that have, or are likely to have, a measurable negative effect on migratory bird populations develop and implement a Memorandum of Understanding (MOU) with the USFWS that shall promote the conservation of migratory bird populations.
Bald and Golden Eagle Protection Act	Declares it is illegal to take, possess, sell, purchase, barter, offer to sell or purchase or barter, transport, export or import a bald or golden eagle, alive or dead, or any part, nest or egg of these eagles unless authorized. Active nest sites are also protected from disturbance during the breeding season.
BLM Manual 6840 — Special Status Species Management	Establishes special status species policy on BLM land for plant and animal species and the habitats on which they depend. The policy refers to species designated by the BLM State Director as sensitive.
Listed Species Recovery Plans and Ecosystem Management Strategies	Provides guidance for the conservation and management of sufficient habitat to maintain viable populations of listed species and ecosystems. Relevant examples include, but are not limited to, the Desert Tortoise Recovery Plan, Flat-tailed Horned Lizard Rangewide Management Strategy; Amargosa Vole Recovery Plan; and Recovery Plan for Upland Species of the San Joaquin Valley.
State	
California Endangered Species Act of 1984 (Fish and Game Code,	Protects California's rare, threatened, and endangered species.

Table A2-4: Applicable Laws and Regulations for Biological Resources

Applicable Law	Description
Sections 2050 through 2098)	
Natural Community Conservation Planning (NCCP) Act 1991	The primary objective of the NCCP program is to conserve natural communities at the ecosystem level while accommodating compatible land use. An NCCP identifies and provides for the regional or areawide protection of plants, animals, and their habitats, while allowing compatible and appropriate economic activity. There are currently 23 NCCPs that have been adopted or are in progress in California.
Porter-Cologne Water Quality Control Act	Requires that each of the nine RWQCBs prepare and periodically update basin plans for water quality control. Each basin plan sets forth water quality standards for surface water and groundwater and actions to control nonpoint and point sources of pollution to achieve and maintain these standards.
Wetlands Preservation (Keene-Nejedly California Wetlands Preservation Act) (PRC, Section 5810 et seq.)	California has established a successful program of regional, cooperative efforts to protect, acquire, restore, preserve, and manage wetlands. These programs include, but are not limited to, the Central Valley Habitat Joint Venture, the San Francisco Bay Joint Venture, the Southern California Wetlands Recovery Project, and the Inter-Mountain West Joint Venture.
California Wilderness Preservation System (PRC, Section 5093.30 et seq.)	Establishes a California wilderness preservation system that consists of State-owned areas to be administered for the use and enjoyment of the people in such manner as will leave them unimpaired for future use and enjoyment as wilderness, provide for the protection of such areas, preserve their wilderness character, and provide for the gathering and dissemination of information regarding their use and enjoyment as wilderness.
Significant Natural Areas (Fish and Game Code Section 1930 et seq.)	Designates certain areas such as refuges, natural sloughs, riparian areas, and vernal pools as significant wildlife habitat.
Protection of Birds and Nests (Fish and Game Code Section 3503 and 3503.5)	Protects California's birds by making it unlawful to take, possess, or needlessly destroy the nest or eggs of any bird. Raptors (e.g., hawks and owls) are specifically protected.
Migratory Birds (Fish and Game Code Section 3513)	Protects California's migratory birds by making it unlawful to take or possess any migratory nongame bird as designated in the Migratory Bird Treaty Act or any part of such migratory nongame birds.

Table A2-4: Applicable Laws and Regulations for Biological Resources

Applicable Law	Description
Fur-bearing Mammals (Fish and Game Code Sections 4000 and 4002)	Lists fur-bearing mammals which require a permit for take.
Fully Protected Species (Fish and Game Code Sections 3511,4700, 5050, and 5515)	Identifies several amphibian, reptile, fish, bird, and mammal species that are Fully Protected. CDFW cannot issue a take permit for these species, except for take related to scientific research.
California Environmental Quality Act (CEQA Guidelines 15380)	CEQA defines rare species more broadly than the definitions for species listed under the state and federal Endangered Species Acts. Under section 15830, species not protected through state or federal listing but nonetheless demonstrable as “endangered” or “rare” under CEQA should also receive consideration in environmental analyses. Included in this category are many plants considered rare by the California Native Plant Society and some animals on the CDFW’s Special Animals List.
Oak Woodlands (California PRC Section 21083.4)	Requires counties to determine if a project within their jurisdiction may result in conversion of oak woodlands that would have a significant adverse effect on the environment. If the lead agency determines that a project would result in a significant adverse effect on oak woodlands, mitigation measures to reduce the significant adverse effect of converting oak woodlands to other land uses are required.
Lake and Streambed Alteration Agreement (Fish and Game Code Sections 1600 et seq.)	Regulates activities that may divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake in California designated by CDFW in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit. Impacts to vegetation and wildlife resulting from disturbances to waterways are also reviewed and regulated during the permitting process.
California Desert Native Plants Act of 1981 (Food and Agricultural Code Section 80001 et seq. and California Fish and Game Code Sections 1925-1926)	Protects non-listed California desert native plants from unlawful harvesting on both public and private lands in Imperial, Inyo, Kern, Los Angeles, Mono, Riverside, San Bernardino, and San Diego counties. Unless issued a valid permit, wood receipt, tag, and seal by the commissioner or sheriff, harvesting, transporting, selling, or possessing specific desert plants is prohibited.
Food and Agriculture Code, Section 403	The California Department of Food and Agriculture is designated to prevent the introduction and spread of injurious insect or animal pests, plant diseases, and noxious weeds.
Noxious Weeds (Title 3, California Code of	List of plant species that are considered noxious weeds.

Table A2-4: Applicable Laws and Regulations for Biological Resources

Applicable Law	Description
Regulations, Section 4500)	
Local	
Various City and County General Plans	General plans typically designate areas for land uses, guiding where new growth and development should occur while providing a plan for the comprehensive and long-range management, preservation, and conservation of and natural resources and open-space lands.
Various Local Ordinances	Local ordinances provide regulations for proposed projects for activities such as grading plans, erosion control, tree removal, protection of sensitive biological resources and open space.

7. Cultural Resources

Applicable laws and regulations associated with cultural resources are discussed in Table A2-5.

Table A2-5: Applicable Laws and Regulations for Cultural Resources

Applicable Regulation	Description
Federal	
Natural Historic Preservation Act (NHPA) of 1966	The NHPA requires federal agencies to consider the preservation of historic and prehistoric resources. The Act authorizes the Secretary of the Interior to expand and maintain a National Register of Historic Places (NRHP), and it establishes an Advisory Council on Historic Preservation (ACHP) as an independent federal entity. Section 106 of the Act requires federal agencies to take into account the effects of their undertakings on historic properties and afford the ACHP a reasonable opportunity to comment on the undertaking prior to licensing or approving the expenditure of funds on any undertaking that may affect properties listed, or eligible for listing, in the NRHP.
National Environmental Policy Act (NEPA) of 1969	NEPA requires federal agencies to foster environmental quality and preservation. Section 101(b)(4) declares that one objective of the national environmental policy is to “preserve important historic, cultural, and natural aspects of our national heritage.” For major federal actions significantly affecting environmental quality, federal agencies must prepare, and make available for public comment, an environmental impact statement.
Archaeological Resources Protection Act of 1979 (NRPA)	NRPA requires a permit for any excavation or removal of archaeological resources from public lands or Indian lands. The statute provides both civil and criminal penalties for violation of

Table A2-5: Applicable Laws and Regulations for Cultural Resources

Applicable Regulation	Description
(16 USC 470aa-470ll)	permit requirements and for excavation or removal of protected resources without a permit.
Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) (Public Law [PL] 101–601)	NAGPRA vests ownership or control of certain human remains and cultural items excavated or discovered on federal or tribal lands, in designated Native American tribes, organizations, or groups. The Act further requires notification of the appropriate Secretary or other head of any federal agency upon the discovery of Native American cultural items on federal or tribal lands; proscribes trafficking in Native American human remains and cultural items; requires federal agencies and museums to compile an inventory of Native American human remains and associated funerary objects, and to notify affected Indian tribes of this inventory; and provides for the repatriation of Native American human remains and specified objects possessed or controlled by federal agencies or museums.
Advisory Council Regulation, Protection of Historic Properties (SHPO) (36 CFR 800)	Establishes procedures for compliance with Section 106 of the NHPA. These regulations define the Criteria of Adverse Effect, define the role of the State Historic Preservation Officer (SHPO) in the Section 106 review process, set forth documentation requirements, and describe procedures to be followed if significant historic properties are discovered during implementation of an undertaking. Prehistoric and historic resources deemed significant (i.e., eligible for listing in the NRHP, per 36 CFR 60.4) must be considered in project planning and construction. The responsible federal agency must submit any proposed undertaking that may affect NRHP-eligible properties to the SHPO for review and comment prior to project approval.
National Park Service Regulations, National Register of Historic Places (NRHP) (36 CFR 60)	Sets forth procedures for nominating properties to the NRHP, and present the criteria to be applied in evaluating the eligibility of historic and prehistoric resources for listing in the NRHP.
Archaeology and Historic Preservation; Secretary of the Interior's Standards and Guidelines (FR 190:44716–44742)	Non-regulatory technical advice about the identification, evaluation, documentation, study, and other treatment of cultural resources. Notable in these Guidelines are the "Standards for Archaeological Documentation" (p. 44734) and "Professional Qualifications Standards for Archaeology" (pp. 44740–44741).
American Indian Religious Freedom Act of 1978	The American Indian Religious Freedom Act pledges to protect and preserve the traditional religious rights of American Indians, Aleuts, Eskimos, and Native Hawaiians. Before the act was passed, certain federal laws interfered with the traditional religious practices of many American Indians. The Act

Table A2-5: Applicable Laws and Regulations for Cultural Resources

Applicable Regulation	Description
	establishes a national policy that traditional Native American practices and beliefs, sites (and right of access to those sites), and the use of sacred objects shall be protected and preserved.
Department of Transportation Act of 1966, Section 4(f)	Section 4(f) of the Act requires a comprehensive evaluation of all environmental impacts resulting from federal-aid transportation projects administered by the Federal Highway Administration (FHA), FTA, and the Federal Aviation Administration (FAA) that involve the use—or interference with use—of several types of land: public park lands, recreation areas, and publicly or privately owned historic properties of federal, state, or local significance. The Section 4(f) evaluation must be sufficiently detailed to permit the U.S. Secretary of Transportation to determine that there is no feasible and prudent alternative to the use of such land, in which case the project must include all possible planning to minimize harm to any park, recreation, wildlife and waterfowl refuge, or historic site that would result from the use of such lands. If there is a feasible and prudent alternative, a proposed project using Section 4(f) lands cannot be approved by the Secretary. Detailed inventories of the locations and likely impacts on resources that fall into the Section 4(f) category are required in project-level environmental assessments.
State	
California Health and Safety Code Section, and California PRC Section	Disturbance of human remains without the authority of law is a felony (California Health and Safety Code, Section 7052). According to State law (California Health and Safety Code, Section 7050.5, California PRC, Section 5097.98), if human remains are discovered or recognized in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains until 1) the coroner of the county has been informed and has determined that no investigation of the cause of death is required; 2) and if the remains are of Native American origin, and if the descendants from the deceased Native Americans have made a recommendation to the landowner or the person responsible for the excavation work for means of treating or disposing of with appropriate dignity the human remains and any associated grave goods as provided in PRC Section 5097.98; or the Native American Heritage Commission was unable to identify a descendent or the descendent failed to make a recommendation within 24 hours after being notified by the Commission. According to the California Health and Safety Code, six or more human burials at one location constitute a

Table A2-5: Applicable Laws and Regulations for Cultural Resources

Applicable Regulation	Description
	cemetery (Section 8100), and disturbance of Native American cemeteries is a felony (Section 7052). Section 7050.5 requires that construction or excavation be stopped in the vicinity of discovered human remains until the coroner can determine whether the remains are those of a Native American. If the remains are determined to be Native American, the coroner must contact the Native American Heritage Commission, who has jurisdiction over Native American remains (California Health and Safety Code, 7052.5c; PRC, Section 5097.98).
California Environmental Quality Act (CEQA Guidelines Section 15380)	CEQA requires that public agencies financing or approving public or private projects must assess the effects of the project on cultural resources. Furthermore, it requires that, if a project results in significant impacts on important cultural resources, alternative plans or mitigation measures must be considered; only significant cultural resources, however, need to be addressed. Thus, prior to the development of mitigation measures, the importance of cultural resources must be determined.
Assembly Bill 52 (Statutes of 2014)	Assembly Bill (AB) 52 (Gatto, Chapter 532, Statutes of 2014) recognizes that tribal sovereignty and the unique relationship of California local governments and public agencies with California Native American tribal governments, while respecting the interests and roles of project proponents. This requires specific consultation processes for project review and approval.
Local	
City/County General Plans	Policies, goals, and implementation measures in county or city general plans may contain measures applicable to cultural and paleontological resources. In addition to the enactment of local and regional preservation ordinances, CEQA requires that resources included in local registers be considered (pursuant to Section 5020.1(k) of the PRC). Therefore, local county and municipal policies, procedures, and zoning ordinances must be considered in the context of project-specific undertakings. Cultural resources are generally discussed in either the open space element or the conservation element of the general plan. Many local municipalities include cultural resources preservation elements in their general plans that include some mechanism pertaining to cultural resources in those communities. In general, the sections pertaining to archaeological and historical properties are put in place to afford the cultural resources a measure of local protection. The policies outlined in the individual general plans should be consulted prior to any undertaking or project.

Table A2-5: Applicable Laws and Regulations for Cultural Resources

Applicable Regulation	Description
Cooperative Agreements Among Agencies	Cooperative agreements among land managing agencies (BLM, National Park Service, U.S. Forest Services, California State Parks, Bureau of Indian Affairs, Department of Defense, to name a few) the SHPO and ACHP may exist and will need to be complied with on specific projects. In addition, certain agencies have existing Programmatic Agreements requiring permits (CPUC, BLM) to complete archaeological investigations and employ the Secretary of Interior's Professional Qualification Standards and Guidelines (36 CFR 61).

8. Energy Demand

Applicable laws and regulations associated with energy resources are discussed in Table A2-6.

Table A2-6: Applicable Laws and Regulations for Energy Resources

Regulation	Description
Federal	
Energy Policy and Conservation Act	The Energy Policy and Conservation Act of 1975 sought to ensure that all vehicles sold in the U.S. would meet certain fuel economy goals. Through this Act, Congress established the first fuel economy standards for on-road motor vehicles in the U.S. Pursuant to the Act, the National Highway Traffic and Safety Administration, which is part of the U.S. Department of Transportation (DOT), is responsible for establishing additional vehicle standards and for revising existing standards. From 1986 to 2012, fuel economy standards for passenger vehicles remained nearly stagnant at between 20.7 mpg for trucks and 27.5 mpg for light duty cars. In 2010, U.S. EPA adopted new passenger vehicle standards starting with the 2012 model year that incorporates GHG emissions standards on a vehicle-footprint basis and to accommodate the efficiencies of electric and other alternatively fueled vehicles. Additional standards for models years through 2025 were adopted in 2012. Translating the GHG standards to miles per gallon equivalents, the projected fuel economy standard for new passenger cars and light trucks combined would increase from 30.1 to 54.5 between 2012 and 2025 model years. Until 2010, heavy-duty vehicles (i.e., vehicles and trucks over 8,500 pounds gross vehicle weight) were not subject to fuel economy standards. In 2011, the National Highway Traffic Safety Administration (NHTSA) and U.S. EPA released fuel economy

Table A2-6: Applicable Laws and Regulations for Energy Resources

Regulation	Description
	standards for medium and heavy-duty vehicles (over 8,500 pounds gross vehicle weight) for 2014 through 2018 model years. Fuel economy standards for these vehicles vary by vehicle profession and include explicit mpg goals as well as percent reduction targets. Stricter fuel economy standards for medium and heavy-duty vehicles are expected in 2015. Compliance with federal fuel economy standards is determined on the basis of each manufacturer's average fuel economy for the portion of its vehicles produced for sale in the U.S. The Corporate Average Fuel Economy (CAFE) program, administered by the U.S. EPA, was created to determine vehicle manufacturers' compliance with the fuel economy standards. The U.S. EPA calculates a CAFE value for each manufacturer based on city and highway fuel economy test results and vehicle sales. Based on the information generated under the CAFE program, the DOT is authorized to assess penalties for noncompliance.
Energy Policy Act (EPAct) of 1992	EPAct was passed to reduce the country's dependence on foreign petroleum and improve air quality. EPAct includes several parts intended to build an inventory of alternative fuel vehicles (AFVs) in large, centrally fueled fleets in metropolitan areas. EPAct requires certain federal, state, and local government and private fleets to purchase a percentage of light duty AFVs capable of running on alternative fuels each year. In addition, financial incentives are included in EPAct. Federal tax deductions will be allowed for businesses and individuals to cover the incremental cost of AFVs. States are also required by the act to consider a variety of incentive programs to help promote AFVs.
Energy Policy Act of 2005	The Energy Policy Act of 2005 was signed into law on August 8, 2005. Generally, the act provides for renewed and expanded tax credits for electricity generated by qualified energy sources, such as landfill gas; provides bond financing, tax incentives, grants, and loan guarantees for a clean renewable energy and rural community electrification; and establishes a federal purchase requirement for renewable energy.
State	
Warren-Alquist State Energy Resources Conservation and	The Warren-Alquist Act is the legislation that created and gives statutory authority to the CEC (formally called the State Energy Resources Conservation and Development Commission).

Table A2-6: Applicable Laws and Regulations for Energy Resources

Regulation	Description
Development Act of 1974	
Senate Bill 1389, Integrated Energy Policy Reports (Statutes of 2002)	Senate Bill (SB) 1389 (Bowen, Chapter 568, Statutes of 2002) requires the CEC to prepare a biennial integrated energy policy report that contains an assessment of major energy trends and issues facing the State's electricity, natural gas, and transportation fuel sectors and provides policy recommendations to conserve resources; protect the environment; ensure reliable, secure, and diverse energy supplies; enhance the State's economy; and protect public health and safety (PRC Section 25301[a]). The CEC prepares these assessments and associated policy recommendations every 2 years, with updates in alternate years, as part of the Integrated Energy Policy Report (IEPR). Preparation of the IEPR involves close collaboration with federal, state, and local agencies and a wide variety of stakeholders in an extensive public process to identify critical energy issues and develop strategies to address those issues.
California Long-Term Energy Efficiency Strategic Plan	On September 18, 2008, the CPUC adopted California's first Long Term Energy Efficiency Strategic Plan, presenting a single roadmap to achieve maximum energy savings across all major groups and sectors in California. This comprehensive plan for 2009 to 2020 is the State's first integrated framework of goals and strategies for saving energy, covering government, utility, and private sector actions, and holds energy efficiency to its role as the highest priority resource in meeting California's energy needs. Action plans have also been developed to provide a framework for implementing each chapter of the Strategic plan, including the Residential Zero Net Energy (ZNE) Action Plan (June 2015), the Codes and Standards Action Plan (March 2014), Research and Technology Action Plan (2013), Lighting Action Plan (November 2013), and the ZNE Commercial Building Action Plan (June 2011).
California Building Energy Efficiency Standards (24 CCR Part 6)	California's Building Energy Efficiency Standards conserve electricity and natural gas in new building construction and are administered by the CEC. Local governments enforce the standards through local building permitting and inspections. The CEC has updated these standards on a periodic basis. The new 2016 Building Energy Efficiency Standards, which take effect on January 1, 2017, are approximately 28 percent more efficient than previous standards for residential construction.
Assembly Bill 758, Comprehensive Energy Efficiency	AB 758 (Skinner, Chapter 470, Statutes 2009) requires the CEC, in collaboration with the CPUC and stakeholders, to

Table A2-6: Applicable Laws and Regulations for Energy Resources

Regulation	Description
Plan for Existing Buildings (Statues of 2009)	develop a comprehensive program to achieve greater energy efficiency in the State's existing buildings.
Senate Bill X1-2, California 2020 Renewable Energy Portfolio Standard (RPS) (Statutes of 2011), and Senate Bill 350, 2030 RPS Update (Statutes of 2015).	In 2011, Governor Brown signed SB X1-2, which requires retail sellers of electricity, including investor-owned utilities and community choice aggregators, to provide at least 33 percent of their electricity supply (portfolio) from renewable sources by 2020. The CPUC and the CEC jointly implement the Statewide RPS program through rulemakings and monitoring the activities of electric energy utilities in the state. SB 350 (De Leon, Chapter 547, Statutes of 2015) requires that the RPS be increased to 50 percent by 2030.
California Qualifying Facility and Combined Heat and Power Program Settlement	In December 2010, the CPUC approved California's Qualifying Facility and Combined Heat and Power Program Settlement, which established a CHP framework for the State's investor-owned utilities. The settlement established a near-term target of 3,000 megawatts (MW) of CHP for entities under the jurisdiction of the CPUC, although this target includes not just new CHP, but capacity from renewal of contracts due to expire in the next 3 years. The CPUC has also adopted a settlement agreement that includes reforms to the Rule 21 interconnection process to provide a clear, predictable path to interconnection of distributed generation while maintaining the safety and reliability of the grid.
Assembly Bill 2076, California Strategy to Reduce Petroleum Dependence (Statutes of 2000)	AB 2076 (Shelley, Chapter 936, Statutes of 2000) requires the CEC and the CARB to develop and submit to the Legislature a strategy to reduce petroleum dependence in California. The statute requires the strategy to include goals for reducing the rate of growth in the demand for petroleum fuels. In addition, the strategy is required to include recommendations to increase transportation energy efficiency as well as the use of non-petroleum fuels and advanced transportation technologies including alternative fuel vehicles, hybrid vehicles, and high-fuel efficiency vehicles. The strategy, *Reducing California's Petroleum Dependence*, was adopted by the CEC and CARB in 2003. The strategy recommends that California reduce inroad gasoline and diesel fuel demand to 15 percent below 2003 demand levels by 2020 and maintain that level for the foreseeable future; the Governor and Legislature work to establish national fuel economy standards that double the fuel efficiency of new cars, light trucks, and sport utility vehicles; and increase the use of nonpetroleum fuels to 20 percent of on-road fuel consumption by 2020 and 30 percent by 2030.

Table A2-6: Applicable Laws and Regulations for Energy Resources

Regulation	Description
Assembly Bill 118, Alternative and Renewable Fuel and Vehicle Technology Program (Statutes of 2007)	AB 118 (Nunez, Chapter 750, Statues of 2007) created the CEC's Alternative and Renewable Fuel and Vehicle Technology Program. The statute, subsequently amended by AB 109 (Nunez, Chapter 313, Statues of 2008), authorizes the CEC to develop and deploy alternative and renewable fuels and advanced transportation technologies to help attain the State's climate change policies.
Assembly Bill 1007, Alternative Fuels Plan	AB 1007 requires the CEC to prepare a state plan to increase the use of alternative fuels in California. Any environmental document prepared for a strategic growth plan, regional blueprint general plan metropolitan planning or transportation plan should include an evaluation of alternative fuels for emissions or criteria pollutants, TACs, GHGs, water pollutants, and other harmful substances, and their impacts on petroleum consumption, and set goals for increased alternative fuel use in the state for the next decades, and recommend policies to ensure the alternative fuel goals are attained, including standards on transportation fuels and vehicle and policy mechanisms to ensure vehicles operating on alternative fuels use those fuels to the maximum extent feasible.
Executive Order S-06-06, Bioenergy Action Plan	Executive Order S-06-06, signed in 2006, establishes targets for the use and production of biofuels and biopower and directs state agencies to work together to advance biomass programs in California while providing environmental protection and mitigation. This executive order establishes the following target to increase the production and use of bioenergy, including ethanol and biodiesel fuels made from renewable resources: produce a minimum of 20 percent of its biofuels within California by 2010, 40 percent by 2020, and 75 percent by 2050. The Executive Order also calls for the state to meet a target for use of biomass electricity.
Executive Order S-01-07, Governor's Low Carbon Fuel Standard (LCFS)	Executive Order S-01-07, signed in 2007, establishes a statewide goal to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020 through establishment of the Low Carbon Fuel Standard (LCFS). The executive order requires LCFS to be incorporated into the State Alternative Fuels Plan required by AB 1007 and is one of the proposed discrete early action GHG reduction measures identified by CARB pursuant to AB 32. In January, 2010, the Office of Administrative Law approved the LCFS regulation.

Table A2-6: Applicable Laws and Regulations for Energy Resources

Regulation	Description
Local	
City/County General Plans	Many cities and counties have general plan elements and policies that specifically address energy use and conservation. Those energy conservation measures outlined in the various county and city general plans contain goals, objectives, and policies aimed at reducing energy consumption. Proponents of specific projects would be required to consult the applicable general plans and design the projects consistent with the guidelines of those general plans in which the projects are located.

9. Geology, Soils and Mineral Resources

Applicable laws and regulations associated with geology and soils are discussed in Table A2-7.

Table A2-7: Applicable Laws and Regulations for Geology, Soils, and Mineral Resources

Regulation	Description
Federal	
SDWA - Federal UIC Class II Program for Oil and Gas Related Injection Wells	The Class II Program for Oil and Gas Related Injection Wells requires states to meet EPA's minimum requirements for UIC programs including strict construction and conversion standards and regular testing and inspection. Enhanced oil and gas recovery wells may either be issued permits or be authorized by rule. Disposal wells are issued permits.
CWA	This law was enacted to restore and maintain the chemical, physical, and biological integrity of the nation's waters by regulating point and nonpoint pollution sources, providing assistance to publicly owned treatment works for the improvement of wastewater treatment, and maintaining the integrity of wetlands. This includes the creation of a system that requires states to establish discharge standards specific to water bodies (National Pollution Discharge Elimination System [NPDES]), which regulates storm water discharge from construction sites through the implementation of a Storm Water Pollution Prevention Plan (SWPPP). In California, the State's NPDES permit program is implemented and administered by the local Regional Water Quality Control Boards.
Earthquake Hazards Reduction Act and National Earthquake	This Act established the National Earthquake Hazards Reduction Program to reduce the risks to life and property from future earthquakes. This program was significantly amended in November 1990 by the National Earthquake Hazards Reduction

Table A2-7: Applicable Laws and Regulations for Geology, Soils, and Mineral Resources

Regulation	Description
Hazards Reduction Program Act	Program Act by refining the description of agency responsibilities, program goals and objectives.
Mining and Mineral Policy Act	The Mining and Mineral Act of 1970 declared that the Federal Government policy is to encourage private enterprise in the development of a sound and stable domestic mineral industry, domestic mineral deposits, minerals research, and methods for reclamation in the minerals industry.
State	
Seismic Hazards Mapping Act (PRC Section 2690–2699)	The Seismic Hazards Mapping Act (the Act) of 1990 (PRC, Chapter 7.8, Division 2) directs the California DOC, Division of Mines and Geology (now called California Geological Survey [CGS]) to delineate Seismic Hazard Zones. The purpose of the Act is to reduce the threat to public health and safety and to minimize the loss of life and property by identifying and mitigating seismic hazards. These include areas identified that are subject to the effects of strong ground shaking, such as liquefaction, landslides, tsunamis, and seiches. Cities, counties, and state agencies are directed to use seismic hazard zone maps developed by CGS in their land-use planning and permitting processes. The Act requires that site-specific geotechnical investigations be performed prior to permitting most urban development projects within seismic hazard zones.
Alquist-Priolo Earthquake Fault Zoning Act (PRC Section 2621 et seq.)	California's Alquist-Priolo Act, originally enacted in 1972 as the Alquist-Priolo Special Studies Zones Act and renamed in 1994, is intended to reduce the risk to life and property from surface fault rupture during earthquakes. The Alquist-Priolo Act prohibits the location of most types of structures intended for human occupancy across the traces of active faults and strictly regulates construction in the corridors along active faults (Earthquake Fault Zones). It also defines criteria for identifying active faults, giving legal weight to terms such as "active," and establishes a process for reviewing building proposals in and adjacent to Earthquake Fault Zones. Under the Alquist-Priolo Act, faults are zoned, and construction along or across them is strictly regulated if they are "sufficiently active" and "well-defined." A fault is considered sufficiently active if one or more of its segments or strands shows evidence of surface displacement during Holocene time (defined for the purposes of the act as within the last 11,000 years). A fault is considered well-defined if its trace can be clearly identified by a trained geologist at the ground surface or in the shallow subsurface, using standard professional techniques, criteria, and judgment.

Table A2-7: Applicable Laws and Regulations for Geology, Soils, and Mineral Resources

Regulation	Description
California Division of Oil, Gas, and Geothermal Resources (DOGGR)(PRC Section 3106)	PRC Section 3106 mandates the supervision of drilling, operation, maintenance, and abandonment of oil wells for the purpose of preventing: damage to life, health, property, and natural resources; damage to underground and surface waters suitable for irrigation or domestic use; loss of oil, gas, or reservoir energy; and damage to oil and gas deposits by infiltrating water and other causes. In addition, the DOGGR regulates drilling, production, injection, and gas storage operations in accordance with 14 CCR Chapter 4, Subchapter 1.
Landslide Hazard Identification Program (PRC Section 2687(a))	The Landslide Hazard Identification Program requires the State Geologist to prepare maps of landslide hazards within urbanizing areas. According to PRC Section 2687(a), public agencies are encouraged to use these maps for land use planning and for decisions regarding building, grading, and development permits.
California Building Standards Code (CBSC) (24 CCR)	California's minimum standards for structural design and construction are given in the CBSC (24 CCR). The CBSC is based on the Uniform Building Code (International Code Council 1997), which is used widely throughout U.S. (generally adopted on a state-by-state or district-by-district basis) and has been modified for California conditions with numerous, more detailed or more stringent regulations. The CBSC provides standards for various aspects of construction, including (i.e., not limited to) excavation, grading, and earthwork construction; fills and embankments; expansive soils; foundation investigations; and liquefaction potential and soil strength loss. In accordance with California law, proponents of specific projects would be required to comply with all provisions of the CBSC for certain aspects of design and construction.
Surface Mining and Reclamation Act (SMARA)	The intent of SMARA of 1975 is to promote production and conservation of mineral resources, minimize environmental effects of mining, and to assure that mined lands will be reclaimed to conditions suitable for alternative uses. An important part of the SMARA legislation requires the State Geologist to classify land according to the presence or absence of significant mineral deposits. Local jurisdictions are given the authority to permit or restrict mining operations, adhering to the SMARA legislation. Classification of an area using MRZs to designate lands that contain mineral deposits are designed to protect mineral deposits from encroaching urbanization and land uses that are incompatible with mining. The MRZ classifications reflect varying degrees of mineral significance, determined by available knowledge of the presence or absence

Table A2-7: Applicable Laws and Regulations for Geology, Soils, and Mineral Resources

Regulation	Description
	of mineral deposits as well as the economic potential of the deposits.
Local	
Geotechnical Investigation	Local jurisdictions typically regulate construction activities through a process that may require the preparation of a site-specific geotechnical investigation. The purpose of a site-specific geotechnical investigation is to provide a geologic basis for the development of appropriate construction design. Geotechnical investigations typically assess bedrock and Quaternary geology, geologic structure, soils, and the previous history of excavation and fill placement. Proponents of specific projects that require design of earthworks and foundations for proposed structures will need to prepare geotechnical investigations on the physical properties of soil and rock at the site prior to project design.
Local Grading and Erosion Control Ordinances	Many counties and cities have grading and erosion control ordinances. These ordinances are intended to control erosion and sedimentation caused by construction activities. A grading permit is typically required for construction-related projects. As part of the permit, project applicants usually must submit a grading and erosion control plan, vicinity and site maps, and other supplemental information. Standard conditions in the grading permit include a description of Best Management Practices similar to those contained in a SWPPP.
City/County General Plans	Most city and county general plans include an element that covers geology, soil, and mineral resources within that jurisdiction.

10. Greenhouse Gases

Applicable laws and regulations specific to the reduction of GHG emissions are listed in Table A2-8 below. It should be noted that other laws and regulations described under Energy Demand in this Environmental Setting would also reduce GHG emissions.

Table A2-8: Applicable Laws and Regulations for Greenhouse Gases

Regulation	Description
Federal	
Mandatory Greenhouse Gas Reporting Rule	On September 22, 2009, U.S. EPA issued a final rule for mandatory reporting of GHGs from large GHG emissions sources in the U.S. In general, this national reporting requirement will provide U.S. EPA with accurate and timely GHG emissions data

Table A2-8: Applicable Laws and Regulations for Greenhouse Gases

Regulation	Description
	from facilities that emit 25,000 metric tons or more of CO_2 per year. This publically available data will allow the reporters to track their own emissions, compare them to similar facilities, and aid in identifying cost effective opportunities to reduce emissions in the future. Reporting is at the facility level, except that certain suppliers of fossil fuels and industrial greenhouse gases along with vehicle and engine manufacturers will report at the corporate level. An estimated 85 percent of the total U.S. GHG emissions, from approximately 10,000 facilities, are covered by this final rule.
National Program to Cut Greenhouse Gas Emissions and Improve Fuel Economy for Cars and Trucks	On September 15, 2009, U.S. EPA and the Department of Transportation's NHTSA proposed a new national program that would reduce GHG emissions and improve fuel efficiency for all new cars and trucks sold in the U.S. EPA proposed the first-ever national GHG emissions standards under the CAA, and NHTSA proposed CAFE standards under the Energy Policy and Conservation Act. This proposed national program would allow automobile manufacturers to build a single light-duty national fleet that satisfies all requirements under both Federal programs and the standards of California and other states. The President requested that U.S. EPA and NHTSA, on behalf of the Department of Transportation, develop, through notice and comment rulemaking, a coordinated National Program under the CAA and the Energy Policy and Conservation Act (EPCA), as amended by the Energy Independence and Security Act (EISA), to reduce fuel consumption by and GHG emissions of light-duty vehicles for model years 2017-2025. U.S. EPA and NHTSA are developing the proposal based on extensive technical analyses, an examination of the factors required under the respective statutes and on discussions with individual motor vehicle manufacturers and other stakeholders. The National Program would apply to passenger cars, light-duty trucks, and medium-duty passenger vehicles (light-duty vehicles) built in those model years (76 FR 48758). The first part of this program (i.e., 2012-2016) is implemented. The next part (i.e., 2017-2025) is currently in process for which CARB is proposed to accept compliance thereof as also being acceptable for California compliance, similar to what was done for the first part.
Endangerment and Cause or Contribute Findings	On December 7, 2009, U.S. EPA adopted its Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases under the CAA (Endangerment Finding). The

Table A2-8: Applicable Laws and Regulations for Greenhouse Gases

Regulation	Description
	Endangerment Finding is based on Section 202(a) of the CAA, which states that the Administrator (of EPA) should regulate and develop standards for "emission[s] of air pollution from any class of classes of new motor vehicles or new motor vehicle engines, which in [its] judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare." The rule addresses Section 202(a) in two distinct findings. The first addresses whether or not the concentrations of the six key GHGs (i.e., carbon dioxide [CO_2], methane, nitrous oxide [N_2O], hydrofluorocarbons [HFCs], perfluorocarbons [PFCs], and sulfur hexafluoride [SF_6]) in the atmosphere threaten the public health and welfare of current and future generations. The second addresses whether or not the combined emissions of GHGs from new motor vehicles and motor vehicle engines contribute to atmospheric concentrations of GHGs and therefore the threat of climate change. The Administrator found that atmospheric concentrations of GHGs endanger the public health and welfare within the meaning of Section 202(a) of the CAA. The evidence supporting this finding consists of human activity resulting in "high atmospheric levels" of GHG emissions, which are very likely responsible for increases in average temperatures and other climatic changes. Furthermore, the observed and projected results of climate change (e.g., higher likelihood of heat waves, wild fires, droughts, sea level rise, and higher intensity storms) are a threat to the public health and welfare. Therefore, GHGs were found to endanger the public health and welfare of current and future generations. The Administrator also found that GHG emissions from new motor vehicles and motor vehicle engines are contributing to air pollution, which is endangering public health and welfare. EPA's final findings respond to the 2007 U.S. Supreme Court decision that GHGs fit within the CAA definition of air pollutants. The findings do not in and of themselves impose any emission reduction requirements but rather allow U.S. EPA to finalize the GHG standards proposed earlier in 2009 for new light-duty vehicles as part of the joint rulemaking with the Department of Transportation.
Significant New Alternatives Policy	U.S. EPA's Significant New Alternatives Policy (SNAP) program provide an evolving list of alternatives (i.e., chemicals that may replace one that is currently in use for a specific purpose). U.S. EPA makes decisions informed by the overall understanding of

Table A2-8: Applicable Laws and Regulations for Greenhouse Gases

Regulation	Description
	the environmental and human health impacts as well as the current knowledge regarding available substitutes. Where U.S. EPA is determining whether to add a new substitute to the list, U.S. EPA compares the risk posed by the new substitute to the risks posed by other alternatives on the list and determines whether that specific new substitutes poses more risk than already-listed alternatives for the same use. Section 612 of the Clean Air Act provides that U.S. EPA must prohibit the use of a substitute where it has determined that there are other available substitutes that pose less overall risk to human health and the environment.
State	
Senate Bill 32 and Assembly Bill 197 (Statutes of 2016)	Governor Brown signed SB 32 (Pavley, Chapter 249, Statutes of 2016) and AB 197 (Garcia, Chapter 250, Statutes of 2016) on September 8, 2016. SB 32 establishes a statewide target of reducing statewide GHG emissions to 40 percent below 1990 levels by 2030. This is the same target as Executive Order B-30-15 (2015). SB 32 authorizes CARB to adopt regulations to achieve the maximum technologically-feasible and cost-effective GHG reductions. AB 197 creates a legislative committee to oversee CARB and requires CARB to take specific actions when adopting plans and regulations pursuant to SB 32 related to disadvantaged communities, identification of specific information regarding reduction measures, and information regarding existing greenhouse gases at the local level.
Executive Order B-30-15	Executive Order B-30-15 (2015) established a California GHG reduction target of 40 percent below 1990 levels by 2030. To accomplish this goal, directs state agencies to take measures consistent with their existing authority to reduce greenhouse gas emissions. In addition, the California Air Resources Board will initiate a public process in the summer of 2015 and work closely with other state agencies to update the State's climate change Scoping Plan. The updated Scoping Plan will provide a framework for achieving the 2030 target and will be completed and adopted by the California Air Resources Board in 2016. Concurrent planning efforts related to energy efficiency in existing buildings (AB 758), short-lived climate pollutants, sustainable freight, Greenhouse Gas Reduction Fund Investments, forest health, and others will be coordinated with, and feed into, the updated Scoping Plan.

Table A2-8: Applicable Laws and Regulations for Greenhouse Gases

Regulation	Description
Executive Order S-3-05	Executive Order S-3-05, which was signed by former Governor Schwarzenegger in 2005, proclaims that California is vulnerable to the impacts of climate change. It declares that increased temperatures could reduce the Sierra's snowpack, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. To combat those concerns, the Executive Order established total greenhouse gas emission targets. Specifically, emissions are to be reduced to the 2000 level by 2010, the 1990 level by 2020, and to 80 percent below the 1990 level by 2050. The Executive Order directed the Secretary of the California Environmental Protection Agency (CalEPA) to coordinate a multi-agency effort to reduce greenhouse gas emissions to the target levels. The Secretary will also submit biannual reports to the governor and state legislature describing: progress made toward reaching the emission targets; impacts of global warming on California's resources; and mitigation and adaptation plans to combat these impacts. To comply with the Executive Order, the Secretary of the Cal/EPA created the Climate Action Team (CAT) made up of members from various state agencies and commission. CAT released its first report in March 2006. The report proposed to achieve the targets by building on voluntary actions of California businesses, local government and community actions, as well as through state incentive and regulatory programs.
Senate Bill 350, Clean Energy and Pollution Reduction Act of 2015 (Statues of 2015)	The Clean Energy and Pollution Reduction Act of 2015 (De León, Chapter 547, Statutes of 2015) requires the amount of electricity generated and sold to retail customers per year from eligible renewable energy resources be increased to 50percent by December 31, 2030. This act also requires doubling of the energy efficiency savings in electricity and natural gas for retail customers, through energy efficiency and conservation, by December 31, 2030.
Senate Bill 605, Short-Lived Climate Pollutants (Statutes of 2014)	SB 605 (Lara, Chapter 605, Statutes of 2014) directs CARB to complete a comprehensive strategy to reduce emissions of short-lived climate pollutants in the state through the following actions: (1) Complete an inventory of sources and emissions of short-lived climate pollutants in the state based on available data. (2) Identify research needs to address any data gaps. (3) Identify existing and potential new control measures to reduce emissions.

Table A2-8: Applicable Laws and Regulations for Greenhouse Gases

Regulation	Description
	(4) Prioritize the development of new measures for short-lived climate pollutants that offer co-benefits by improving water quality or reducing other air pollutants that impact community health and benefit disadvantaged communities, as identified pursuant to Section 39711 of the Health and Safety Code. (5) Coordinate with other state agencies and districts to develop measures identified as part of the comprehensive strategy.
Assembly Bill 32, the California Global Warming Solutions Act (Statutes of 2006)	In September 2006, former Governor Arnold Schwarzenegger signed AB 32 (Nunez, Chapter 488, Statutes of 2006), the California Global Warming Solutions Act of 2006. AB 32 establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and a cap on statewide GHG emissions. AB 32 requires that statewide GHG emissions be reduced to 1990 levels by 2020. This reduction will be accomplished through an enforceable statewide cap on GHG emissions that was be phased in starting in 2012. To effectively implement the cap, AB 32 directs CARB to develop and implement regulations to reduce statewide GHG emissions from substantial stationary and mobile source categories. Requires CARB to produce a Scoping Plan by 1/1/2009 and at least every 5 years afterwards that details how the state will meet its GHG reduction targets. AB 32 requires that CARB adopt a quantified cap on GHG emissions representing 1990 emissions levels and disclose how it arrives at the cap; institute a schedule to meet the emissions cap; and develop tracking, reporting, and enforcement mechanisms to ensure that the state achieves the reductions in GHG emissions necessary to meet the cap. AB 32 also includes guidance to institute emissions reductions in an economically efficient manner and conditions to ensure that businesses and consumers are not unfairly affected by the reductions.
Assembly Bill 1493 (Statutes of 2002)	In September 2004, CARB approved regulations to reduce GHG emissions from new motor vehicles. The Board took this action pursuant to Chapter 200, Statutes of 2002 (AB 1493, Pavley) which directed the Board to adopt regulations that achieve the maximum feasible and cost effective reduction in greenhouse gas emissions from motor vehicles. The regulations, which took effect in 2006 following an opportunity for legislative review, apply to new passenger vehicles and light duty trucks beginning with the 2009 model year.

Table A2-8: Applicable Laws and Regulations for Greenhouse Gases

Regulation	Description
Executive Order S-1-07	Executive Order S-1-07, which was signed by former Governor Schwarzenegger in 2007, proclaims that the transportation sector is the main source of GHG emissions in California, at over 40 percent of statewide emissions. It establishes a goal that the carbon intensity of transportation fuels sold in California should be reduced by a minimum of 10 percent by 2020. This order also directed CARB to determine if this LCFS could be adopted as a discrete early action measure after meeting the mandates in AB 32. CARB adopted the LCFS on April 23, 2009.
Senate Bill 1368 (Statutes of 2006)	SB 1368 (Perata, Chapter 598, Statutes of 2006) is the companion bill of AB 32 and was signed by former Governor Schwarzenegger in September 2006. SB 1368 requires the CPUC to establish a GHG emission performance standard for baseload generation from investor owned utilities by February 1, 2007. The CEC must establish a similar standard for local publicly owned utilities by June 30, 2007. These standards cannot exceed the GHG emission rate from a baseload combined-cycle natural gas fired plant. The legislation further requires that all electricity provided to California, including imported electricity, must be generated from plants that meet the standards set by the CPUC and CEC.
Senate Bill 1078 (Statutes of 2002), Senate Bill 107 (Statutes of 2006), and Senate Bill x1 2 (Statutes of 2010)	SB 1078 (Sher, Chapter 516, Statutes of 2002) requires retail sellers of electricity, including investor-owned utilities and community choice aggregators, to provide at least 20 percent of their supply from renewable sources by 2017. SB 107 (Simitian, Chapter 464, Statutes of 2006) changed the target date to 2010. In 2010, SBx1 2 (Simitian, Chapter 1, Statutes of 2010) was chaptered, which expanded the State's Renewable Portfolio Standard to 33 percent renewable power by 2020.
Senate Bill 97 (Statutes of 2007)	As directed by SB 97 (Dutton, Chapter 185, Statutes of 2007), the Natural Resources Agency adopted Amendments to the CEQA Guidelines for GHG emissions on December 30, 2009. On February 16, 2010, the Office of Administrative Law approved the Amendments, and filed them with the Secretary of State for inclusion in the California Code of Regulations. The Amendments became effective on March 18, 2010.
Senate Bill 375 (Statutes of 2008)	SB 375 (Steinberg, Chapter 728, Statutes of 2008), signed in September 2008, aligns regional transportation planning efforts, regional GHG reduction targets, and land use and housing allocation. SB 375 requires Metropolitan Planning Organizations (MPOs) to adopt a Sustainable Communities Strategy (SCS) or

Table A2-8: Applicable Laws and Regulations for Greenhouse Gases

Regulation	Description
	Alternative Planning Strategy (APS), which will prescribe land use allocation in that MPO's Regional Transportation Plan (RTP). CARB, in consultation with MPOs, will provide each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in the region for the years 2020 and 2035. These reduction targets will be updated every 8 years, but can be updated every 4 years if advancements in emissions technologies affect the reduction strategies to achieve the targets. CARB is also charged with reviewing each MPO's SCS or APS for consistency with its assigned targets. If MPOs do not meet the GHG reduction targets, transportation projects would not be eligible for funding programmed after January 1, 2012. This bill also extends the minimum time period for the Regional Housing Needs Allocation (RNHA) cycle from 5 years to 8 years for local governments located within an MPO that meets certain requirements. City or county land use policies (including general plans) are not required to be consistent with the RTP (and associated SCS or APS). However, new provisions of CEQA would incent qualified projects that are consistent with an approved SCS or APS, categorized as "transit priority projects."
Executive Order S-13-08	Sea level rise is a foreseeable indirect environmental impact associated with climate change, largely attributable to thermal expansion of the oceans and melting polar ice. As discussed above in the environmental setting (subheading "Adaptation to Climate Change"), sea level rise presents impacts to California associated with coastal erosion, water supply, water quality, saline-sensitive species and habitat, land use compatibility, and flooding. Former Governor Arnold Schwarzenegger signed Executive Order S-13-08 on November 14, 2008. This executive order directed the California Natural Resources Agency (CNRA) to develop the 2009 California Climate Adaptation Strategy (CNRA 2009)), which summarizes the best known science on climate change impacts in seven distinct sectors—public health, biodiversity and habitat, ocean and coastal resources, water management, agriculture, forest resources, and transportation and energy infrastructure—and provides recommendations on how to manage against those threats. This executive order also directed OPR, in cooperation with the CNRA, to provide land use planning guidance related to sea level rise and other climate change impacts by May 30, 2009, which is also provided in the 2009 California Climate Adaptation Strategy (CNRA 2009) and

Table A2-8: Applicable Laws and Regulations for Greenhouse Gases

Regulation	Description
	OPR continues to further refine land use planning guidance related to climate change impacts. Executive Order S-13-08 also directed CNRA to convene an independent panel to complete the first California Sea Level Rise Assessment Report. This report is to be completed no later than December 1, 2010. The report is intended to provide information on the following: (1) Relative sea level rise projections specific to California, taking into account issues such as coastal erosion rates, tidal impacts, El Niño and La Niña events, storm surge, and land subsidence rates; (2) The range of uncertainty in selected sea level rise projections; (3) A synthesis of existing information on projected sea level rise impacts to state infrastructure (such as roads, public facilities and beaches), natural areas, and coastal and marine ecosystems; and (4) Discussion of future research needs regarding sea level rise for California.
CARB's Landfill Methane Control Measure	The regulation requires owners and operators of certain uncontrolled municipal solid waste landfills to install gas collection and control systems, and requires existing and newly installed gas and control systems to operate in an optimal manner. The regulation allows local air districts to voluntarily enter into agreements with CARB to implement and enforce the regulation and to assess fees to cover costs. Some local air districts have also adopted rules to implement federal standards for the installation of gas collection and control systems.
Assembly Bill 341(Statutes of 2011)	AB 341 (Chesbro, Chapter 476, Statutes of 2011) established a State target to reduce by 75 percent the amount of solid waste sent to landfills by 2020 through recycling, composting, and source reduction practices.
Assembly Bill (Statutes of 2014)	AB 1826 (Chesbro, Chapter 727, Statutes of 2014) requires businesses generating specified amounts of organic wastes to begin arranging for the recycling and diversion of those wastes from landfill disposal beginning in 2016.
Refrigerant Management Plan	The Refrigerant Management Plan requires facilities with refrigeration systems with more than 50 pounds of high-GWP refrigerant to: conduct and report periodic leak inspections; promptly repair leaks; and keep service records on site.

Table A2-8: Applicable Laws and Regulations for Greenhouse Gases

Regulation	Description
Compliance Offset Protocols under the State's Cap-and-Trade Program	Compliance Offset Protocols under the State's Cap-and-Trade Program include a livestock protocol, rice cultivation protocol, and mine methane capture protocol. The protocols provide methods to quantify, report, and credit GHG emission reductions from sectors not covered by the Cap-and-Trade Program.
Assembly Bill 1257 (Statutes of 2013)	AB 1257 (Bocanegra, Chapter 749, Statutes of 2013) directs the CEC to assemble a report by November 2015 (and every four years after), in consultation with other State agencies, to identify strategies for maximizing the benefits obtained from natural gas as an energy source.
Assembly Bill 1900 (Statutes of 2012)	AB 1900 (Gatto, Chapter 602, Statutes of 2012) directed the CPUC to adopt natural gas constituent standards (in consultation with CARB and the Office of Environmental Health and Hazard Assessment). The legislation is also designed to streamline and standardize customer pipeline access rules, and encourage the development of statewide policies and programs to promote all sources of biomethane production and distribution.
Low Carbon Fuel Standard (LCFS)	The LCFS requires transportation fuel providers to procure clean fuels to reduce the carbon intensity of California's fuel mix. The LCFS provides a market signal to incentivize using captured methane as a transportation fuel, among other clean fuel options.
Senate Bill 1122 (Statutes of 2012)	SB 1122 (Rubio, Chapter 612, Statutes 2012) directed the CPUC to require the State's investor-owned utilities to develop and offer 10 to 20-year market-price contracts to procure an additional 250 megawatts of cumulative electricity generation from biogas facilities that commence operating on or after June of 2013.

11. Hazards and Hazardous Materials

Applicable laws and regulations associated with hazards and hazardous materials are discussed in Table A2-9.

Table A2-9: Applicable Laws and Regulations for Hazards and Hazardous Materials

Regulations	Description
Federal	
CWA (40 CFR 112)	The 1972 amendments to the CWA provide the statutory basis for the NPDES permit program and the basic structure for regulating the discharge of pollutants from point sources to

Table A2-9: Applicable Laws and Regulations for Hazards and Hazardous Materials

Regulations	Description
	waters of the U.S. Section 402 of the CWA specifically required U.S. EPA to develop and implement the NPDES program.
Safe Drinking Water Act (SDWA)	SDWA is the main federal law that ensures the quality of Americans' drinking water. Under SDWA, U.S. EPA sets standards for drinking water quality and oversees the states, localities, and water suppliers who implement those standards. SDWA was originally passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply. The law was amended in 1986 and 1996 and requires many actions to protect drinking water and its sources: rivers, lakes, reservoirs, springs, and ground water wells. SDWA does not regulate private wells which serve fewer than 25 individuals.
Federal Hazardous Materials Regulations (FHMR) Title 49, Code of Federal Regulations, Parts 100-180	The regulations establish criteria for the safe transport of hazardous materials. Compliance is mandatory for intrastate and interstate transportation.
Toxic Substances Control Act (TSCA) (15 U.S.C. Section 2601 et seq)	TSCA provides U.S. EPA with authority to require reporting, record-keeping and testing requirements, and restrictions relating to chemical substances and/or mixtures. TSCA addresses the production, importation, use, and disposal of specific chemicals including polychlorinated biphenyls (PCBs), asbestos, radon and lead-based paint.
Resource Conservation and Recovery Act (RCRA) 42 U.S.C. Section 6901 et seq. (40 CFR)	RCRA of 1976 gives U.S. EPA the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled U.S. EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. HSWA - the Federal Hazardous and Solid Waste Amendments - are the 1984 amendments to RCRA that focused on waste minimization and phasing out land disposal of hazardous waste as well as corrective action for releases. Some of the other mandates of this law include increased enforcement authority for EPA, more stringent hazardous waste management standards, and a comprehensive underground storage tank program. Federal regulations adopted by U.S. EPA are found in Title 40, Code of Federal Regulations (40 CFR).

Table A2-9: Applicable Laws and Regulations for Hazards and Hazardous Materials

Regulations	Description
Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)	CERCLA, commonly known as Superfund, was enacted by Congress on December 11, 1980. This law created a tax on the chemical and petroleum industries and provided broad Federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment. CERCLA also enabled the revision of the National Contingency Plan (NCP). The NCP provided the guidelines and procedures needed to respond to releases and threatened releases of hazardous substances, pollutants, or contaminants. The NCP also established the NPL. The Superfund Amendments and Reauthorization Act (SARA) of 1986 reauthorized CERCLA to continue cleanup activities around the country. Several site-specific amendments, definitions clarifications, and technical requirements were added to the legislation, including additional enforcement authorities. Also, Title III of SARA authorized the Emergency Planning and Community Right-to-Know Act (EPCRA).
Emergency Planning and Community Right-to-Know Act (EPCRA) (42 USC Section 9601 et seq.)	The SARA of 1986 created EPCRA (40 CFR Parts 350-372), also known as SARA Title III, a statute designed to improve community access to information about chemical hazards and to facilitate the development of chemical emergency response plans by state/tribe and local governments. EPCRA required the establishment of state/tribe emergency response commissions (SERCs/TERCs), responsible for coordinating certain emergency response activities and for appointing local emergency planning committees.
State	
Hazardous Materials Transportation (California Vehicle Code Sections 31301-31309)	Regulations pertaining to the safe transport of hazardous materials are in California Vehicle Code Sections 31301-31309. All motor carriers and drivers involved in transportation of hazardous materials must comply with the requirements contained in federal and state regulations, and must apply for and obtain a hazardous materials transportation license from the California Highway Patrol. A driver is required to obtain a hazardous materials endorsement issued by the driver's country or state of domicile to operate any commercial vehicle carrying hazardous materials. The driver is required to display placards or markings while hauling hazardous waste, unless the driver is exempt from the endorsement requirements. A driver who is a California resident is required to obtain an endorsement from California Highway Patrol.
Hazardous Waste Control Law	California requirements and statutory responsibilities in managing hazardous waste in California – this includes the

Table A2-9: Applicable Laws and Regulations for Hazards and Hazardous Materials

Regulations	Description
California Health & Safety Code, Division 20, Chapter 6.5, 22 CCR, Division 4.5	generation, transportation, storage, treatment, recycling, and disposal of hazardous waste. The statute and regulation are implemented by Cal/EPA Department of Toxic Substances Control.
California Accidental Release Prevention (CalARP) Program 19 CCR Division 2, Chapter 4.5, Sections 2735-2785	The purpose of the CalARP program is to prevent accidental releases of substances that can cause serious harm to the public and the environment, to minimize the damage if releases do occur, and to satisfy community right-to-know laws. This is accomplished by requiring businesses that handle more than a threshold quantity of a regulated substance listed in the regulations to develop a Risk Management Plan (RMP). An RMP is a detailed engineering analysis of the potential accident factors present at a business and the mitigation measures that can be implemented to reduce this accident potential.
Hazardous Material Business Plan & Area Plan Program Health and Safety Code Sections 25500 – 25520 19 CCR, Division 2, Chapter 4, Article 3 & 4	The business and area plans program, relating to the handling and release or threatened release of hazardous materials, was established in California to protect the public health and safety and the environment. Basic information on the location, type, quantity, and the health risks of hazardous materials handled, used, stored, or disposed of in the state, which could be accidently released into the environment, is not now available to firefighters, health officials, planners, public safety officers, health care providers, regulatory agencies, and other interested persons. The information provided by business and area plans is necessary in order to prevent or mitigate the damage to the health and safety of persons and the environment from the release or threatened release of hazardous materials into the workplace and environment. Certified Unified Program Agencies (CUPAs) use information collected from the Business Plan and CalARP programs to identify hazardous materials in their communities. This information provides the basis for the Area Plan and is used to determine the appropriate level of emergency planning necessary to respond to a release.
Unified Program Administration Health and Safety Code, Chapter 6.11, Sections 25404-25404.8 27 CCR, Division 1, Subdivision 4,	A CUPA, which is authorized by the Secretary of Cal/EPA to carry out several of the hazardous waste/hazardous materials regulatory programs administered by the State in a coordinated and consistent manner. The six hazardous waste and materials program elements covered by the CUPA include: (1) Hazardous Waste Generators (2) Underground Tanks (3) Above Ground Tanks

Table A2-9: Applicable Laws and Regulations for Hazards and Hazardous Materials

Regulations	Description
Chapter 1, Sections 15100-15620	(4) Accidental Release Program (5) Hazardous Material Release Response Plans & Spill Notification (6) Hazardous Materials Management Plans & Inventory Reporting The intent of the CUPA is to simplify the hazardous materials regulatory environment and provide a single point of contact for businesses to address inspection, permitting, billing, and enforcement issues.
Fuels and Fuel Additive Program (40 CFR 79)	U.S. EPA regulates diesel fuels under two programs; one is administered under the Office of Pollution Prevention and Toxic Substances (OPPTS) and the other is administered under the Transportation and Air Quality group. The OPPTS requires that all chemicals produced in the U.S. are registered with the Toxic Substances Control Act. The Transportation and Air Quality group requires that any fuels sold for ground transportation purposes must be registered with U.S. EPA and the volumes reported on a quarterly basis.
Local	
Various Local Ordinances	Various ordinances and codes may be adopted at the local level to provide stricter requirements in the management of hazardous materials and waste activities within the jurisdiction.

12. Hydrology and Water Quality

Applicable laws and regulations associated with hydrology, water quality, and water supply are discussed in Table A2-10.

Table A2-10: Applicable Laws and Regulations for Hydrology, Water Quality, and Water Supply

Regulation	Description
Federal	
National Flood Insurance Program (NFIP)	Designated floodplain mapping program, flooding and flood hazard reduction implementation, and federal subsidized flood insurance for residential and commercial property. Administered by the Federal Emergency Management Agency (FEMA).
Executive Order 11988	Requires actions to be taken for federal activities to reduce the risks of flood losses, restore and preserve floodplains, and minimize flooding impacts to human health and safety.

Table A2-10: Applicable Laws and Regulations for Hydrology, Water Quality, and Water Supply

Regulation	Description
CWA	Administered primarily by the EPA. Pertains to water quality standards, state responsibilities, and discharges of waste to waters of the U.S. Sections 303, 401, 402, and 404.
CWA Section 303	Defines water quality standards consisting of: 1) designated beneficial uses of a water, 2) the water quality criteria (or ”objectives” in California) necessary to support the uses, and 3) an antidegradation policy that protects existing uses and high water quality. Section 303(d) requires states to identify water quality impairments where conventional control methods will not achieve compliance with the standards, and establish Total Maximum Daily Load (TMDL) programs to achieve compliance.
CWA Section 401	State certification system for federal actions which may impose conditions on a project to ensure compliance with water quality standards.
CWA Section 402	Section 402 mandates permits for municipal stormwater discharges, which are regulated under the NPDES General Permit for Municipal Separate Storm Sewer Systems (MS4) (MS4 Permit). Several of the cities and counties issue their own NPDES municipal stormwater permits for the regulations of stormwater discharges. These permits require that controls are implemented to reduce the discharge of pollutants in stormwater discharges to the maximum extent possible, including management practices, control techniques, system design and engineering methods, and other measures as appropriate. As part of permit compliance, these permit holders have created Stormwater Management Plans for their respective locations. These plans outline the requirements for municipal operations, industrial and commercial businesses, construction sites, and planning and land development. These requirements may include multiple measures to control pollutants in stormwater discharge. During implementation of specific projects, applicants will be required to follow the guidance contained in the Stormwater Management Plans as defined by the permit holder in that location.
CWA Section 404	Permit system for dredging or filling activity in waters of the U.S., including wetlands, and administered by USACE.
National Toxics Rule and California Toxics Rule	Applicable receiving water quality criteria promulgated by U.S. EPA for priority toxic pollutants consisting generally of trace metals, synthetic organic compounds, and pesticides.
State	
California Water Rights	The SWRCB administers review, assessment, and approval of appropriative (or priority) surface water rights permits/licenses for diversion and storage for beneficial use. Riparian water

Table A2-10: Applicable Laws and Regulations for Hydrology, Water Quality, and Water Supply

Regulation	Description
	rights apply to the land and allow diversion of natural flows for beneficial uses without a permit, but users must share the resources equitably during drought. Groundwater management planning is a function of local government. Groundwater use by overlying property owners is not formally regulated, except in cases where the groundwater basin supplies are limited and uses have been adjudicated, or through appropriative procedures for groundwater transfers.
Public Trust Doctrine	Body of common law that requires the state to consider additional terms and conditions when issuing or reconsidering appropriative water rights to balance the use of the water for many beneficial uses irrespective of the water rights that have been established. Public trust resources have traditionally included navigation, commerce, and fishing and have expanded over the years to include protection of fish and wildlife, and preservation goals for scientific study, scenic qualities, and open-space uses.
Porter-Cologne Water Quality Control Act and California Water Code (Title 23)	The SWRCB is responsible for statewide water quality policy development and exercises the powers delegated to the State by the federal government under the CWA. Nine RWQCBs adopt and implement water quality control plans (Basin Plans) which designate beneficial uses of surface waters and groundwater aquifers, and establish numeric and narrative water quality objectives for beneficial use protection. RWQCBs issue waste discharge requirements for discharge activities to water and land, require monitoring and maintain reporting programs, and implement enforcement and compliance policies and procedures. Other state agencies with jurisdiction in water quality regulation in California include the Department of Public Health (drinking water regulations), Department of Pesticide Regulation, Department of Toxic Substances Control, CDFW, and the Office of Environmental Health and Hazard Assessment.
Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California	Commonly referred to as the State Implementation Policy (or SIP), the SIP provides implementation procedures for discharges of toxic pollutants to receiving waters.
Thermal Plan	The Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Water and Enclosed Bays and

Table A2-10: Applicable Laws and Regulations for Hydrology, Water Quality, and Water Supply

Regulation	Description
	Estuaries of California was adopted by the SWRCB in 1972 and amended in 1975. The Thermal Plan restricts discharges of thermal waste or elevated temperature waste to waters of the state. Generally, the Thermal Plan prohibits discharges from increasing ambient temperatures by more than 1ºF over more than 25 percent of a stream cross section, increasing ambient temperatures by more than 4ºF in any location, and prohibits discharge of waste that exceeds more than 20ºF above the ambient temperature.
Statewide NPDES General Permit for Stormwater Associated with Land Disturbance and Construction Activity (Order No. 2009-0009-DWQ, NPDES No. CAR000002)	NPDES permit for stormwater and non-storm discharges from construction activity that disturbs greater than 1 acre. The general construction permit requires the preparation of a SWPPP that identifies BMPs to be implemented to control pollution of storm water runoff. The permit specifies minimum construction BMPs based on a risk-level determination of the potential of the project site to contribute to erosion and sediment transport and sensitivity of receiving waters to sediment. While small amounts of construction-related dewatering are covered under the General Construction Permit, the RWQCB has also adopted a General Order for Dewatering and Other Low Threat Discharges to Surface Waters (General Dewatering Permit). This permit applies to various categories of dewatering activities and may apply to some construction sites, if construction of specific projects required dewatering in greater quantities than that allowed by the General Construction Permit and discharged the effluent to surface waters. The General Dewatering Permit contains waste discharge limitations and prohibitions similar to those in the General Construction Permit.
Statewide NPDES General Permit for Discharges of Stormwater Associated with Industrial Facilities (Order No. 97-003-DWQ, NPDES No. CAS000001)	NPDES permit for stormwater and non-storm discharges from types of industrial sites based on the Standard Industrial Classification. The general industrial permit requires the preparation of a SWPPP that identifies potential onsite pollutants, BMPs to be implemented, and inspection/monitoring.
Senate Bill 1168 (Statutes of 2014)	This bill (Pavley, Chapter 346, Statutes of 2014) requires all groundwater basins designated as high- or medium-priority basins by DWR that are designated as basins subject to critical conditions of overdraft to be managed under a groundwater sustainability plan or coordinated groundwater sustainability plans by January 31, 2020, and requires all other groundwater

Table A2-10: Applicable Laws and Regulations for Hydrology, Water Quality, and Water Supply

Regulation	Description
	basins designated as high- or medium-priority basins to be managed under a groundwater sustainability plan or coordinated groundwater sustainability plans by January 31, 2022. This bill would require a groundwater sustainability plan to be developed and implemented to meet the sustainability goal, established as prescribed, and would require the plan to include prescribed components.
Assembly Bill 1739 (Statutes of 2014)	This bill (Dickinson, Chapter 347, Statutes of 2014) establishes groundwater reporting requirements for a person extracting groundwater in an area within a basin that is not within the management area of a groundwater sustainability agency or a probationary basin. The bill requires the reports to be submitted to the SWRCB or, in certain areas, to an entity designated as a local agency by the SWRCB.
Senate Bill 1319 (Statutes of 2014)	This bill (Pavley, Chapter 348, Statutes of 2014) allows the SWRCB to designate a groundwater basin as a probationary basin subject to sustainable groundwater management requirements. This bill also authorizes SWRCB to develop an interim management plan in consultation with the DWR under specified conditions.
Mining and Mineral Policy Act	The Mining and Mineral Act of 1970 declared that the Federal Government policy is to encourage private enterprise in the development of a sound and stable domestic mineral industry, domestic mineral deposits, minerals research, and methods for reclamation in the minerals industry.
Local	
Water Agencies	Water agencies enter into contracts or agreements with the federal and state governments to protect the water supply and to ensure the lands within the agency have a dependable supply of suitable quality water to meet present and future needs.
Floodplain Management	General plans guide county land use decisions, and require the identification of water resource protection goals, objectives, and policies. Floodplain management is addressed through ordinances, land use planning, and development design review and approval. Local actions may be coordinated with FEMA for the National Flood Insurance Program. Typical provisions address floodplain use restrictions, flood protection requirement, allowable alteration of floodplains and stream channels, control of fill and grading activities in floodplains, and prevention of flood diversions where flows would increase flood hazards in other areas.

Table A2-10: Applicable Laws and Regulations for Hydrology, Water Quality, and Water Supply

Regulation	Description
Drainage, Grading, and Erosion Control Ordinances	Counties regulate building activity under the federal Uniform Building Code, local ordinances, and related development design review, approval, and permitting. Local ordinances are common for water quality protection addressing drainage, stormwater management, land grading, and erosion and sedimentation control.
Environmental Health	The RWQCBs generally delegate permit authority to county health departments to regulate the construction and operation/maintenance of on-site sewage disposal systems (e.g., septic systems and leach fields, cesspools).

13. Land Use and Planning

Applicable laws and regulations associated with land use and planning are discussed in Table A2-11.

Table A2-11: Applicable Laws and Regulations for Land Use and Planning

Regulation	Description
Federal	
FLPMA	FLPMA is the principal law governing how the BLM manages public lands. FLPMA requires the BLM to manage public land resources for multiple use and sustained yield for both present and future generations. Under FLPMA, the BLM is authorized to grant right-of-ways for generation, transmission, and distribution of electrical energy. Although local agencies do not have jurisdiction over the federal lands managed by the BLM, under FLPMA and the BLM regulations at 43 CFR Part 1600, the BLM must coordinate its planning efforts with state and local planning initiatives. FLPMA defines an Area of Critical Environmental Concern (ACEC) as an area within the public lands where special management attention is required (when such areas are developed or used or where no development is required) to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards. The BLM identifies, evaluates, and designates ACECs through its resource management planning process. Allowable management practices and uses, mitigation, and use limitations, if any, are described in the planning document and the concurrent or subsequent ACEC Management Plan. ACECs are considered land use authorization avoidance areas because they are known to contain resource values that could result in

Table A2-11: Applicable Laws and Regulations for Land Use and Planning

Regulation	Description
	denial of applications for land uses that cannot be designed to be compatible with management objectives and prescriptions for the ACEC.
BLM Resource Management Plans	Established by FLPMA, Resource Management Plans are designed to protect present and future land uses and to identify management practices needed to achieve desired conditions within the management area covered by the Resource Management Plans. Management direction is set forth in the Resource Management Plans in the form of goals, objectives, standards, and guidelines. These, in turn, direct management actions, activities, and uses that affect land management, and water, recreation, visual, natural, and cultural resources.
National Forest Management Act (NFMA)	NFMA is the primary statute governing the administration of national forests. The act requires the Secretary of Agriculture to assess forest lands, develop a management program based on multiple-use, sustained-yield principles, and implement a resource management plan for each unit of the National Forest System. Goal 4 of the USFS's National Strategic Plan for the National Forests states that the nation's forests and grasslands play a significant role in meeting America's need for producing and transmitting energy. Unless otherwise restricted, National Forest Service lands are available for energy exploration, development, and infrastructure (e.g., well sites, pipelines, and transmission lines). However, the emphasis on non-recreational special uses, such as utility corridors, is to authorize the special uses only when they cannot be reasonably accommodated on non-National Forest Service lands.
State	
State Planning and Zoning Law	California Government Code Section 65300 et seq. establishes the obligation of cities and counties to adopt and implement general plans. The general plan is a comprehensive, long-term, and general document that describes plans for the physical development of the city or county. The general plan addresses a broad range of topics, including, at a minimum, land use, circulation, housing, conservation, open space, noise, and safety. In addressing these topics, the general plan identifies the goals, objectives, policies, principles, standards, and plan proposals that support the city or county's vision for the area. The general plan is also a long-range document that typically addresses the physical character of an area over a 20-year period. Although the general plan serves as a blueprint for future development and identifies the overall vision for the planning area, it remains general enough to allow for flexibility in the approach taken to achieve the plan's goals.

Table A2-11: Applicable Laws and Regulations for Land Use and Planning

Regulation	Description
Subdivision Map Act (Government Code Section 66410 et seq.)	In general, land cannot be divided in California without local government approval. The primary goals of the Subdivision Map Act are: (a) to encourage orderly community development by providing for the regulation and control of the design and improvements of the subdivision with a proper consideration of its relation to adjoining areas; (b) to ensure that the areas within the subdivision that are dedicated for public purposes will be properly improved by the subdivider so that they will not become an undue burden on the community; and (c) to protect the public and individual transferees from fraud and exploitation. (61 Ops. Cal.Atty. Gen. 299, 301 [1978]; 77 Ops. Cal.Atty. Gen. 185 [1994]). Dividing land for sale, lease or financing is regulated by local ordinances based on the state Subdivision Map Act (Government Code Section 66410 et seq.).
Local	
General Plans	The most comprehensive land use planning is provided by city and county general plans, which local governments are required by State law to prepare as a guide for future development. The general plan contains goals and policies concerning topics that are mandated by state law or which the jurisdiction has chosen to include. Required topics are: land use, circulation, housing, conservation, open space, noise, and safety. Other topics that local governments frequently choose to address are public facilities, parks and recreation, community design, or growth management, among others. City and county general plans must be consistent with each other. County general plans must cover areas not included by city general plans (i.e., unincorporated areas).
Specific and Community Plans	A city or county may also provide land use planning by developing community or specific plans for smaller, more specific areas within their jurisdiction. These more localized plans provide for focused guidance for developing a specific area, with development standards tailored to the area, as well as systematic implementation of the general plan. Specific and community plans are required to be consistent with the city or county's general plan.
Zoning	The city or county zoning code is the set of detailed requirements that implement the general plan policies at the level of the individual parcel. The zoning code presents standards for different uses and identifies which uses are allowed in the various zoning districts of the jurisdiction. Since 1971, state law has required the city or county zoning code to be consistent with the jurisdiction's general plan, except in charter cities.

14. Noise

Applicable laws and regulations associated with noise are discussed in Table A2-12.

Table A2-12: Applicable Laws and Regulations for Noise

Regulation	Description
Federal	
Federal Noise Control Act (1972) EPA (40 CFR 201-211)	This act established a requirement that all federal agencies administer their programs to promote an environment free of noise that jeopardizes public health or welfare. U.S. EPA was given the responsibility for providing information to the public regarding identifiable effects of noise on public health or welfare, publishing information on the levels of environmental noise that will protect the public health and welfare with an adequate margin of safety, coordinating federal research and activities related to noise control, and establishing federal noise emission standards for selected products distributed in interstate commerce. This act also directed that all federal agencies comply with applicable federal, state, interstate, and local noise control regulations.
Quiet Communities Act (1978)	This act promotes the development of effective state and local noise control programs, to provide funds for noise research, and to produce and disseminate educational materials to the public on the harmful effects of noise and ways to effectively control it.
14 CFR, Part 150 (FAA)	These address airport noise compatibility planning and include a system for measuring airport noise impacts and present guidelines for identifying incompatible land uses. All land uses are considered compatible with noise levels of less than 65 dBA L_{dn}. At higher noise levels, selected land uses are also deemed acceptable, depending on the nature of the use and the degree of structural noise attenuation provided.
International Standards and Recommended Practices (International Civil Aviation Organization)	This contains policies and procedures for considering environmental impacts (e.g., aircraft noise emission standards and atmospheric sound attenuation factors).
32 CFR, Part 256 (Department of Defense Air Installations Compatible Use	AICUZ plans prepared for individual airfields are primarily intended as recommendations to local communities regarding the importance of maintaining land uses which are compatible with the noise and safety impacts of military aircraft operations.

Table A2-12: Applicable Laws and Regulations for Noise

Regulation	Description
Zones [AICUZ] Program)	
23 CFR, Part 772, Federal Highway Administration (FHWA) standards, policies, and procedures	FHWA standards, policies, and procedures provide procedures for noise studies and noise abatement measures to help protect the public health and welfare, to supply noise abatement criteria, and to establish requirements for information to be given to local officials for use in the planning and design of highways.
29 CFR, Part 1910, Section 1910.95 (U.S. Department of Labor Occupational Safety and Health Administration [OSHA])	This regulation established a standard for noise exposure in the workplace.
FTA Guidance	This guidance presents procedures for predicting and assessing noise and vibration impacts of proposed mass transit projects. All types of bus and rail projects are covered. Procedures for assessing noise and vibration impacts are provided for different stages of project development, from early planning before mode and alignment have been selected through preliminary engineering and final design. Both for noise and vibration, there are three levels of analysis described. The framework acts as a screening process, reserving detailed analysis for projects with the greatest potential for impacts while allowing a simpler process for projects with little or no effects. This guidance contains noise and vibration impact criteria that are used to assess the magnitude of predicted impacts. A range of mitigation is described for dealing with adverse noise and vibration impacts.
49 CFR 210 (Federal Rail Administration [FRA] Railroad Noise Emission Compliance Standards) and FRA Guidance (2005)	This section and guidance provides contains criteria and procedures for use in analyzing the potential noise and vibration impacts of various types of high-speed fixed guideway transportation systems.
State	
CPUC Section 21670	The State Aeronautics Act of the CPUC establishes statewide requirements for airport land use compatibility planning and

Table A2-12: Applicable Laws and Regulations for Noise

Regulation	Description
	requires nearly every county to create an Airport Land Use Commission or other alternative.
Section 5000 et seq. (21 CCR Division 2.5, Chapter 6), California Airport Noise Regulations Promulgated in Accordance with the State Aeronautics Act	In Section 5006, the regulations state that: "The level of noise acceptable to a reasonable person residing in the vicinity of an airport is established as a CNEL value of 65 dBA for purposes of these regulations. This criterion level has been chosen for reasonable persons residing in urban residential areas where houses are of typical California construction and may have windows partially open. It has been selected with reference to speech, sleep, and community reaction.
24 CCR, Part 2	These establish standards governing interior noise levels that apply to all new single-family and multi-family residential units in California. These standards require that acoustical studies be performed before construction at building locations where the existing L_{dn} exceeds 60 dBA. Such acoustical studies are required to establish mitigation that will limit maximum Ldn levels to 45 dBA in any habitable room.

15. Population, Employment, and Housing

See land use planning and housing-related regulations in Section 13.0, Land Use and Planning.

16. Public Services

Applicable laws and regulations associated with public services are discussed in Table A2-13.

Table A2-13: Applicable Laws and Regulations for Public Services

Regulation	Description
Federal	**None applicable.**
American with Disabilities Act (ADA)	Guidelines to ensure that facilities are accessible to individuals with disabilities. Implements requirements for the design and construction of buildings.
State	
State Fire Responsibility Areas	Areas delineated by the CAL FIRE for which the state assumes primary financial responsibility for protecting natural resources from damages of fire. Local jurisdictions are required to adopt minimum recommended requirements for road design, road identification, emergency fire suppression and fuel breaks and

	greenbelts. All projects within or adjacent to a State Fire Responsibility Area must meet these requirements.
State School Funding	Education Code Section 17620 authorizes school districts to levy a fee, charge, dedication, or other requirement for any development project for the construction or reconstruction of school facilities.

17. Recreation

Applicable laws and regulations associated with recreation are discussed in Table A2-14.

Table A2-14: Applicable Laws and Regulations for Recreation

Regulation	Description
Federal	
FLPMA, 1976 – 43 (CFR 1600)	Establishes public land policy; guidelines for administration; and provides for the "multiple use" management, protection, development, and enhancement of public lands. Multiple use management, defined as "management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people" with recreation identified as one of the resource values.
State	
	None applicable
Local	
General Plans	General plans for cities and counties contain designations for recreational areas. These are policy documents with planned land use maps and related information that are designed to give long-range guidance to those local officials making decisions affecting the growth and resources of their jurisdictions. Because of the number and variety of general plans and related local plans, they are not listed individually.

18. Transportation and Traffic

Applicable laws and regulations associated with transportation and traffic are discussed in Table A2-15.

Table A2-15: Applicable Laws and Regulations for Transportation and Traffic

Regulation	Description
Federal	
40 CFR, Part 77 (FAA)	Requires a determination of no hazard to air navigation for structures that will be more than 200 feet above ground level.

Table A2-15: Applicable Laws and Regulations for Transportation and Traffic

Regulation	Description
State	
California Vehicle Code (VC) Sections 353; 2500-2505; 31303-31309; 32000-32053; 32100-32109; 31600-31620; California Health and Safety Code Section 25160 et seq.	Regulates the highway transport of hazardous materials.
VC Sections 13369; 15275 and 15278	Addresses the licensing of drivers and the classification of licenses required for the operation of particular types of vehicles and also requires certificates permitting operation of vehicles transporting hazardous materials.
VC Sections 35100 et seq.; 35250 et seq.; 35400 et seq.	Specifies limits for vehicle width, height, and length.
VC Section 35780	Requires permits for any load exceeding Caltrans weight, length, or width standards on public roadways.
California Streets and Highways Code Section 117, 660-672	Requires permits for any load exceeding Caltrans weight, length, or width standards on County roads.
California Streets and Highways Code Sections 117, 660-670, 1450, 1460 et seq., and 1480 et seq.	Regulate permits from Caltrans for any roadway encroachment from facilities that require construction, maintenance, or repairs on or across State highways and County roads.

19. Utilities and Service Systems

Applicable laws and regulations associated with utilities are discussed in Table A2-16.

Table A2-16: Applicable Laws and Regulations for Utilities and Service Systems

Regulation	Description
Federal	
Federal Power Act of 1935	In the Federal Power Act of 1935 (49 Stat. 803), created the Federal Power Commission, an independent regulatory agency with authority over both the interstate transmission of electricity and the sale of hydroelectric power at the wholesale level. The act requires the commission to ensure that electricity rates are "reasonable, nondiscriminatory and just to the consumer." The Federal Power Act of 1935 also amended the criteria that the commission must apply in deciding whether to license the construction and operation of new hydroelectric facilities.

Table A2-16: Applicable Laws and Regulations for Utilities and Service Systems

Regulation	Description
Natural Gas Act of 1938	Together with the Federal Power Act of 1935, the Natural Gas Act of 1938 (NGA) (P.L. 75-688, 52 Stat. 821) was an essential piece of energy legislation in the first half of the 20th century. These statutes regulated interstate activities of the electric and natural gas industries, respectively. The acts are similarly structured and constitute the classic form of command-and-control regulation authorizing the federal government to enter into a regulatory compact with utilities. In short, the Natural Gas Act enabled federal regulators to set prices for gas sold in interstate commerce in exchange for exclusive rights to transport the gas.
Natural Gas Policy Act of 1978	The Natural Gas Policy Act of 1978 (NGPA) granted the FERC authority over intrastate as well as interstate natural gas production. The NGPA established price ceilings for wellhead first sales of gas that vary with the applicable gas category and gradually increase over time.
State	
Waste Heat and Carbon Emissions Reduction Act of 2007	The Waste Heat and Carbon Emissions Reduction Act of 2007 (AB 1613), placed requirements on the CPUC, the CEC, and local electric utilities to develop incentive programs and technical efficiency guidelines to encourage the installation of small CHP systems. The CEC approved efficiency and certification guidelines for eligible systems under AB 1613 in January 2010, and the CPUC approved standardized contracting and pricing provisions between CHP operators and the Investor Owned Utilities in November 2012.
Assembly Bill 1900 (Statutes of 2012)	AB 1900 (Gatto, Chapter 602, Statutes of 2012) directed the CPUC to adopt natural gas constituent standards (in consultation with CARB and the Office of Environmental Health and Hazard Assessment). The legislation is also designed to streamline and standardize customer pipeline access rules, and encourage the development of statewide policies and programs to promote all sources of biomethane production and distribution.
Section 21151.9 of the PRC/ Section 10910 et seq. of the Water Code	Required the preparation of a water supply assessment (WSA) for large developments. These assessments are prepared by public water agencies responsible for providing service and address whether there are adequate existing and projected future water supplies to serve the proposed project. All projects that meet the qualifications for preparing a WSA must identify the water supplies and quantities that would serve the project as well as project the total water demand for the service area (including the project's water demands) by source in 5-year increments over a 20-year period. This information must include

Table A2-16: Applicable Laws and Regulations for Utilities and Service Systems

Regulation	Description
	data for a normal, single-dry, and multiple-dry years. The WSA is required to be approved by the water service agency before the project can be implemented.

B. Canada Regulatory Setting

In Canada, each level of government has powers to protect the environment. This shared nature of environmental jurisdiction makes close cooperation among the federal, provincial, territorial and Aboriginal governments important to Canada's environmental well-being.

Canada is intricately linked to other countries around the globe economically, environmentally, and socially. While global and regional environmental problems impact on Canada's vast geography (e.g., ozone depletion, persistent organic pollutants, climate change), Canada also has a responsibility to reduce its contributions to these problems. Canada has a long history of international cooperation across a broad range of environmental issues. Arrangements range from informal sharing of information to the adoption of formal cooperative agreements to achieve common goals. CEPA 1999 provides the means and opportunity to cooperate with international governments to achieve Canada's environmental policy and regulatory goals.

The Department of the Environment was first established by the Department of the Environment Act in 1971. Today, Environment Canada administers nearly two dozen acts either in whole or in part. It also assists with the administration of many others.

Environment Canada uses regulations to place strict controls on areas governed by these acts. It also enters into voluntary and regulated agreements with individuals or multiple parties in Canada and elsewhere to define mutual commitments, roles and responsibilities and actions on specific environmental issues. Relevant Canadian federal laws and regulation are shown in Table A2-17. Relevant laws and regulations specific to Ontario, Canada are shown in Table A2-18.

Table A2-17: Summary of Canadian Federal Laws and Regulation

Affected Resource	Law/Regulation	Adoption Date/Current To	Responsible Agency	Summary
Federal Acts				
General	Canadian Environmental Protection Act (CEPA), 1999	March 31, 2000	Minister of the Environment and Minister of Health	Within the federal government, CEPA 1999 is the primary element of the legislative framework for protecting the Canadian environment and human health. A key aspect of CEPA 1999 is the prevention and management of risks posed by toxic and other harmful substances. CEPA 1999 also manages environmental and human health impacts of products of biotechnology, marine pollution, disposal at sea, vehicle, engine and equipment emissions, fuels, hazardous wastes, environmental emergencies and other sources of pollution. The Minister of the Environment is accountable to Parliament for the administration of all of CEPA 1999. Both the Minister of the Environment and the Minister of Health jointly administer the task of assessing and managing the risks associated with toxic substances.
General	Environmental Enforcement Act	March 23, 2009	Environment Canada	An Act to make amendments relating to the enforcement of, and to enact provisions respecting the enforcement of, certain Acts that relate to the environment. Intended to ensure more effective enforcement of the laws that protect our national parks, our air, our land, our water, and Canadian wildlife. The Act addresses the shortcomings of existing laws and puts in place a stronger enforcement regime that Canadians want for the protection of their

Table A2-17: Summary of Canadian Federal Laws and Regulation

Affected Resource	Law/Regulation	Adoption Date/Current To	Responsible Agency	Summary
				environment and their health. It introduces stiffer fines and new sentencing powers and considerations, and strengthens the government's ability to investigate and prosecute infractions to give Canadians an effective environmental enforcement regime. The legislative changes are accompanied by a range of other complementary measures as well.
General	Canada-Ontario, Agreement Respecting the Great Lakes Basin Ecosystem	Signed June 2007 Extended to March 31, 2011	Environment Canada	The Canada-Ontario Agreement Respecting the Great Lakes Basin Ecosystem is the federal-provincial agreement that supports the restoration and protection of the Great Lakes Basin Ecosystem. The Agreement outlines how the governments of Canada and Ontario, Canada will cooperate and coordinate their efforts to restore, protect and conserve the Great Lakes Basin Ecosystem. It is the means by which the federal partners of the Canadian Federal Great Lakes Program interact with the provincial ministries to help meet Canada's obligations under the Canada-U.S. Great Lakes Water Quality Agreement (GLWQA).
General	Great Lakes Water Quality Agreement	Signed in 1972 Revised in 1978 Amended 1987 Currently under negotiations for amendment.	Environment Canada	The Great Lakes Water Quality Agreement (GLWQA) expresses the commitment of Canada and the U.S. to restore and maintain the chemical, physical and biological integrity of the Great Lakes basin ecosystem, and includes a number of objectives and guidelines to achieve

Table A2-17: Summary of Canadian Federal Laws and Regulation

Affected Resource	Law/Regulation	Adoption Date/Current To	Responsible Agency	Summary
				these goals. The Agreement reaffirms the rights and obligation of Canada and the U.S. under the Boundary Waters Treaty.
General	Environmental Performance Agreements	Various	Environment Canada	Environment Canada uses a range of tools to protect the environment, including non-regulatory agreements with industry that commit certain sectors or companies to specific challenges or performance levels. Each agreement is negotiated around the key principles and design criteria outlined in Environment Canada's Policy Framework for Environmental Performance Agreements.
General	Canadian Environmental Assessment Act	1992 Act current to April 2, 2012 Last amended on July 12, 2010	Environment Canada	Ensures that the environmental effects of various projects are carefully reviewed before action is taken in order to avoid significant adverse environmental effects.
Aesthetics	Addressed within other laws and regulations.			
Agricultural and Forest Resources	Addressed within other laws and regulations.			
Air Quality	Canada-Wide Standards	January 1998	Health Canada	Canadian Environment Ministers (with the exception of Québec) signed the Canada-Wide Accord on Environmental Harmonization and its sub-agreement on Canada-Wide Standards (CWS). The CWS provide an alternative

Table A2-17: Summary of Canadian Federal Laws and Regulation

Affected Resource	Law/Regulation	Adoption Date/Current To	Responsible Agency	Summary
				regulatory tool for the management of environmental issues of national interest. CWSs are intended to be achievable targets that will reduce health and environmental risks within a specific timeframe. Departments have integrated the NAAQOs (National Ambient Air Quality Objectives) and CWS processes. Air pollutants that have been identified by governments as needing to be managed will be targeted for either CWS or NAAQOs development, not both. CWS are considered Environmental Quality Objectives under CEPA 1999. Airbornes particles (or particulate matter) and ground-level ozone have been identified as priority substances for the development of CWS under the Harmonization agreement and standards have been announced June 2000 for Ozone and PM2.5.
Air Quality	National Ambient Air Quality Objectives (NAAQOs)	1992	Health Canada	National Ambient Air Quality Objectives (NAAQOs) identify benchmark levels of protection for people and the environment. NAAQOs guide federal/ provincial/ territorial and regional governments in making risk-management decisions, playing an important role in air quality management (e.g. local source

Table A2-17: Summary of Canadian Federal Laws and Regulation

Affected Resource	Law/Regulation	Adoption Date/Current To	Responsible Agency	Summary
				permitting, for air quality index and as benchmarks for developing provincial objectives and standards). NAAQOs are viewed as effects-based long-term air quality goals. The air quality objectives must be consistent with the philosophy of the CEPA 1999, and must be based on recognized scientific principles that include risk assessment and risk management. The NAAQOs are set by the federal government based on recommendations from a National Advisory Committee and Working Group on Air Quality Objectives and Guidelines. Provincial governments have the option of adopting these either as objectives or as enforceable standards according to their legislation.
Air Quality	CEPA-National Advisory Committee Working Group on Air Quality Objectives and Guidelines		Health Canada	CEPA - National Advisory Committee (NAC) Working Group on Air Quality Objectives and Guidelines (WGAQOG) consists of representatives of federal, provincial and territorial departments of environment and health. The group was established to review scientific information and prepare recommendations for National Ambient Air Quality Objectives (NAAQOs). Science-based guidance is also provided to support the development of Canada-Wide Standards (CWS). The authority of the working group stems from

Table A2-17: Summary of Canadian Federal Laws and Regulation

Affected Resource	Law/Regulation	Adoption Date/Current To	Responsible Agency	Summary
				CEPA 1999 Part 1 Section 6 (1)(c) where it is formed to support the CEPA-National Advisory Committee (CEPA-NAC).
Air Quality	United States – Canada Air Quality Agreement	Signed in 1991 Expanded in 2000 and 2007		The U.S.-Canada Air Quality Agreement serves as the primary mechanism for binational cooperation to address transboundary air pollution issues.
Biological Resources	Fisheries Act	1985 Act current to March 20, 2012 Last amended on April 1, 2011	Environment Canada on behalf of the Minister of Fisheries and Oceans	Provisions to prevent pollution of waters inhabited by fish.

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Affected Resource	Law/Regulation	Adoption Date/Current To	Responsible Agency	Summary
Biological Resources	Species at Risk Act (SARA)	December 12, 2002 Act current to April 2, 2012 Last amended on October 2, 2011	Environment Canada	The purposes of the Act are to prevent Canadian indigenous species, subspecies, and distinct populations from becoming extirpated or extinct, to provide for the recovery of endangered or threatened species, and encourage the management of other species to prevent them from becoming at risk. SARA is a result of the implementation of the Canadian Biodiversity Strategy, which is in response to the United Nations Convention on Biological Diversity. The Act provides federal legislation to prevent wildlife species from becoming extinct and to provide for their recovery.
Biological Resources	Canada Wildlife Act	1973 Act current to April 2, 2012 Last amended on December 10, 2010	Environment Canada	The Canada Wildlife Act specifies the requirements for a geographic area in Canada to be designated a National Wildlife Area by the Canadian Wildlife Service division of Environment Canada. The purpose of wildlife areas is to preserve habitats that are critical to migratory birds and other wildlife species, particularly those that are at risk. Further, the Wildlife Area Regulations, a component of the Canada Wildlife Act, identifies activities which are prohibited on such areas because they may harm a protected species or its habitat.

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Affected Resource	Law/Regulation	Adoption Date/Current To	Responsible Agency	Summary
Biological Resources	Migratory Birds Convention Act, 1994	Act current to April 2, 2012 Last amended on December 10, 2010	Environment Canada	This Act provides the regulatory requirements regarding Migratory Bird Hunting, as well as those applicable to other activities related to migratory birds, including: ◢ sale, gift or purchase ◢ shipment ◢ aviculture ◢ taxidermy ◢ activities involving birds causing damage or danger (e.g., agriculture) ◢ activities involving overabundant species ◢ activities at airports ◢ activities for scientific research purposes ◢ collection, possession, sale or trade of eiderdown ◢ import of migratory bird species that are not indigenous to Canada The Migratory Bird Sanctuary Regulations grant sanctuary status to areas that represent habitat that is important to migratory birds. These sanctuaries help protect the birds from hunting and all other disturbances while they are in breeding and other staging areas.

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Affected Resource	Law/Regulation	Adoption Date/Current To	Responsible Agency	Summary
Biological Resources	Wild Animal and Plant Protection and Regulation of International and Interprovincial Trade Act (WAPPRIITA)	December 17, 1992 Came into force on May 14, 1996, Act current to April 2, 2012 Last amended on December 10, 2010	Minster of the Environment	The purpose of WAPPRIITA is to protect Canadian and foreign species of animals and plants that may be at risk of overexploitation due to illegal trade and also to safeguard Canadian ecosystems from the introduction of species considered to be harmful. It accomplishes these objectives by controlling the international trade and interprovincial transport of certain wild animals and plants, as well as their parts and derivatives. WAPPRIITA also makes it an offence to transport illegally obtained wildlife between provinces and territories or between Canada and other countries.
Cultural Resources	Movable Cultural Property Program (MCP)	1977	Canadian Cultural Property Export Review Board	Protects objects of cultural significance to Canada, pursuant to the Cultural Property Export and Import Act, by regulating their export; entering into international agreements that prevent the illicit trafficking of cultural property; and designating well-managed custodial institutions and public authorities to be eligible to apply for grants to acquire cultural property and to apply to the Canadian Cultural Property Export Review Board to have donations certified as cultural property for income tax purposes.
Cultural Resources	Department of Canadian Heritage Act	1995	Minister of Canadian Heritage	This Act established the Department of Canadian Heritage over which the Minister of Canadian Heritage presides. Under this Act, the

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Affected Resource	Law/Regulation	Adoption Date/Current To	Responsible Agency	Summary
				Minister's jurisdiction encompasses, but is not limited to, jurisdiction over: (a) the promotion of a greater understanding of human rights, fundamental freedoms and related values; (b) multiculturalism; (c) the arts, including cultural aspects of the status of the artist; (d) cultural heritage and industries, including performing arts, visual and audio-visual arts, publishing, sound recording, film, video and literature; (e) national parks, national historic sites, historic canals, national battlefields, national marine conservation areas, heritage railway stations and federal heritage buildings; (f) the encouragement, promotion and development of amateur sport; (g) the advancement of the equality of status and use of English and French and the enhancement and development of the English and French linguistic minority communities in Canada; (h) state ceremonial and Canadian symbols; (i) broadcasting, except in respect of spectrum management and the technical aspects of broadcasting;

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Affected Resource	Law/Regulation	Adoption Date/Current To	Responsible Agency	Summary
				(j) the formulation of cultural policy, including the formulation of cultural policy as it relates to foreign investment and copyright; (k) the conservation, exportation and importation of cultural property; and (l) national museums, archives and libraries.
Cultural Resources	Heritage Railway Stations Protection Act	1985	Minister responsible for the Parks Canada Agency	The purpose of this Act is to protect heritage railway stations. Unless authorized by the Governor in Council, no railway company shall (a) remove, destroy or alter or sell, assign, transfer or otherwise dispose of a heritage railway station owned by it or otherwise under its control; or (b) alter any of the heritage features of a heritage railway station.
Cultural Resources	Historic Sites and Monuments Act	1985	Minister responsible for the Parks Canada Agency	This Act established the Historic Sites and Monuments Board of Canada. Under this Act, the Minister may: (a) by means of plaques or other signs or in any other suitable manner mark or otherwise commemorate historic places; (b) make agreements with any persons for marking or commemorating historic places pursuant to this Act and for the care and preservation of any places so marked or commemorated;

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Affected Resource	Law/Regulation	Adoption Date/Current To	Responsible Agency	Summary
				(c) with the approval of the Governor in Council, establish historic museums; (d) with the approval of the Treasury Board, acquire on behalf of Her Majesty in right of Canada any historic places, or lands for historic museums, or any interest therein, by purchase, lease or otherwise; and (e) provide for the administration, preservation and maintenance of any historic places acquired or historic museums established pursuant to this Act.
Energy Demand			National Energy Board	The National Energy Board is an independent federal agency that regulates several aspects of Canada's energy industry. Their purpose is to promote safety and security, environmental protection and efficient energy infrastructure and markets in the Canadian public interest within the mandate set by Parliament in the regulation of pipelines, energy development and trade. The National Energy Board is also responsible for all physical activities related to oil and gas exploration and operations in the North.
Energy Demand and Geology, Soils, and Mineral Resources	National Model Construction Codes	2010	National Research Council of Canada	Under Canada's Constitution Act, building, fire safety and plumbing regulations are the responsibility of provincial and territorial governments. The National Research Council of Canada, through its Construction Portfolio, publishes six National Model Construction

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Affected Resource	Law/Regulation	Adoption Date/Current To	Responsible Agency	Summary
				Codes on behalf of the Canadian Commission on Building and Fire Codes, which must be adopted by a regulatory authority in order to come into effect. In some cases, the Codes are amended and/or supplemented to suit regional needs, and then published as provincial codes. The six codes are: **National Building Code of Canada (NBC):** Addresses the design and construction of new buildings and the substantial renovation of existing buildings. **National Fire Code of Canada (NFC):** Provides minimum fire safety requirements for buildings, structures and areas where hazardous materials are used, and addresses fire protection and fire prevention in the ongoing operation of buildings and facilities. **National Plumbing Code of Canada (NPC):** Covers the design and installation of plumbing systems in buildings and facilities. **The National Energy Code of Canada for Buildings (NECB):** Provides technical requirements for the construction of energy-efficient buildings. **National Energy Code of Canada for Houses (NECH):** Provides technical requirements for the construction of energy-efficient houses.

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Affected Resource	Law/Regulation	Adoption Date/Current To	Responsible Agency	Summary
				National Farm Building Code of Canada (NFBC): Provides relaxations of the requirements in the NBC and addresses the particular needs of farm buildings.
Geology, Soils, and Mineral Resources	Metal Mining Effluent Regulations (MMER) (under the Fisheries Act)	Regulations current to April 2, 2012 Last amended on March 2, 2012	Environment Canada	The Metal Mining Effluent Regulations require metal mines to undertake environmental effects monitoring (EEM) to ensure the adequate protection of all receiving aquatic environments by assessing effects on fish, fish habitat and the usability of fisheries resources. The MMER require at least weekly sampling of effluent and the submission of quarterly and annual reports of results within specified time limits.
Geology, Soils, and Mineral Resources	Environmental Code of Practice of Metal Mines, 2009	2009	Environment Canada	The Environmental Code of Practice for Metal Mines describes operational activities and associated environmental concerns of this industrial sector. The document applies to the complete life cycle of mining, from exploration to mine closure, and environmental management practices are recommended to mitigate the identified environmental concerns. The recommended practices in the Code include the development and implementation of environmental management tools, the management of wastewater and mining wastes, and the prevention and control of environmental releases to air, water and land.

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Greenhouse Gases and Climate Change	Passenger Automobiles and Light Truck Greenhouse Gas Emission Regulations	September 23, 2010	Environment Canada	The purpose of these Regulations is to reduce greenhouse gas emissions from passenger automobiles and light trucks by establishing emission standards and test procedures that are aligned with the federal requirements of the U.S. As a result of the regulations, it is projected that the average GHG emission performance of new vehicles for the 2016 model year will be about 25 percent lower than the vehicles that were sold in Canada in 2008.
Greenhouse Gases and Climate Change	Proposed Heavy-Duty Vehicle and Engine Greenhouse Gas Emission Regulations	Proposed April 14, 2012	Environment Canada	The objective is to reduce GHG emissions by establishing mandatory GHG emission standards for new on-road heavy-duty vehicles and engines that are aligned with U.S. national standards. The proposed regulations would reduce emissions from the whole range of on-road heavy-duty vehicles and engines, including large pick-up trucks, short/long-haul tractors, cement and garbage trucks, buses, and more, for the 2014 model year and beyond. They would allow the Government of Canada to continue establishing emission standards and test procedures that are aligned with those of the U.S. As a result of implementing the proposed standards, it is anticipated that greenhouse gas emissions from 2018 heavy-duty vehicles will be

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				reduced by up to 23 percent from those sold in 2010. By the year 2020, it is anticipated that greenhouse gas emissions from Canada's heavy-duty vehicles will be reduced by 3 million tons per year.
Greenhouse Gases and Climate Change	Renewable Fuels Regulations	August 23, 2010	Environment Canada	Requires fuel producers and importers to have an annual average renewable content of five per cent in gasoline starting on December 15, 2010. The Government of Canada also intends to regulate a two per cent requirement for renewable content in diesel fuel and heating oil by 2011, subject to successful demonstration of technical feasibility under the range of Canadian conditions. The two per cent requirement would be put in place by an amendment to the Renewable Fuels Regulations. These regulations will fulfill the commitment made by the Government of Canada in 2006, when it announced that it would regulate renewable fuel content.
Greenhouse Gases and Climate Change	Proposed Reduction of Carbon Dioxide Emissions from Coal-Fired Generation of Electricity Regulations	Proposed June 23, 2010 Final Regulations expected in 2012, to come into effect on July 1, 2015	Environment Canada	These proposed regulations will apply a stringent performance standard to new coal-fired electricity generation units and those coal-fired units that have reached the end of their economic life. The gradual phase-out of traditional coal-fired electricity generation is expected to have a significant impact on reducing emissions. The proposed regulations,

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				in addition to other measures taken by federal and provincial governments and utilities to reduce electricity emissions from coal and other sources, are projected to result in a decline in the absolute level of GHG emissions from electricity generation.
Hazardous Materials/Human Health	Pest Control Products Act	December 12, 2002 Act current to February 9, 2011		To control, among other things, the introduction of new substances and products of biotechnology into the Canadian market so that the risk to the environment and human health is reduced.
Hazardous Materials/Human Health	Feeds Act	Act current to April 2, 2012 Last amended on June 28, 2006		To control, among other things, the introduction of new substances and products of biotechnology into the Canadian market so that the risk to the environment and human health is reduced.
Hazardous Materials/Human Health	Seeds Act	Act current to April 2, 2012 Last amended on December 12, 2005		To control, among other things, the introduction of new substances and products of biotechnology into the Canadian market so that the risk to the environment and human health is reduced.
Hazardous Materials/Human Health	Health of Animals Act	Act current to April 2, 2012 Last amended on July 1, 2007		To control, among other things, the introduction of new substances and products of biotechnology into the Canadian market so that the risk to the environment and human health is reduced.

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Hazardous Materials/Human Health	Canada Shipping Act	Act current to March 20, 2012 Last amended on July 1, 2007	Transport Canada	An Act respecting shipping and navigation and to amend the Shipping Conferences Exemption Act, 1987 and other Acts. This is the principal legislation governing safety in marine transportation and recreational boating, as well as protection of the marine environment. It applies to Canadian vessels operating in all waters and to all vessels operating in Canadian waters (from canoes and kayaks to cruise ships and tankers). The CSA 2001 promotes the sustainable growth of the marine shipping industry without compromising safety.
Hazardous Materials/Human Health	Transportation of Dangerous Goods Act	Act current to April 2, 2012 Last amended on June 16, 2009	Transport Canada	The Transportation of Dangerous Goods Act and Regulations set standards for the movement of harmful chemicals to protect both the public and people moving goods. Dangerous goods are those defined in the regulations. Examples are explosives, compressed gas (such as oxygen, propane, aerosols), flammable liquids (such as paint, gasoline, diesel fuel), oxidizing substances, toxic substances (formerly called poison), infectious substances, corrosive substances, and miscellaneous goods that pose enough of a risk in transport to justify regulation.
Hydrology and Water Quality	Federal Water Policy	1987 Last amended in 2011		The Federal Water Policy addresses the management of water resources, balancing

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				water uses with the requirements of the many interrelationships within the ecosystem. The policy takes into account the needs of all Canadians in its overall objective: to encourage the use of freshwater in an efficient and equitable manner consistent with the social, economic and environmental needs of present and future generations. To manage Canada's water resources, the federal government has defined two main goals: (1) to protect and enhance the quality of the water resource; and, (2) to promote the wise and efficient management and use of water.
Hydrology and Water Quality	Canada Water Act	Passed in 1970 Act current to March 20, 2012 Last amended on April 1, 2005	Environment Canada	An Act to provide for the management of the water resources of Canada, including research and the planning and implementation of programs relating to the conservation, development and utilization of water resources. Contains provisions for formal consultation and agreements with the provinces.
Hydrology and Water Quality	International River Improvements Act	Act current to March 20, 2012 Last amended on December 10, 2010	Environment Canada	An Act respecting the construction, operation and maintenance of international river improvements. Provides for licensing of activities that may alter the flow of rivers flowing into the U.S.
Hydrology and Water Quality	Oceans Act	Passed December 18, 1996	Environment Canada	The Oceans Act provides a framework for modern ocean management. The Act calls for

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		Enacted in 1997 Act current to April 2, 2012 Last amended on October 5, 2005		the Minister of Fisheries and Oceans to lead and facilitate the development of a national ocean management strategy. The Act specifies the need to integrate marine conservation with development activities to maintain healthy ecosystems.
Hydrology and Water Quality	International Boundary Waters Treaty Act	1985 Act current to March 20, 2012	Environment Canada	An Act respecting the International Joint Commission established under the treaty of January 11, 1909 relating to boundary waters.
Hydrology and Water Quality	Navigable Waters Protection Act	Act current to March 20, 2012 Last amended on March 12, 2009	Environment Canada	An Act respecting the protection of navigable waters
Land Use and Planning	Federal Policy on Land Use	1984	Federal government	The Federal Policy on Land Use is designed to guide the internal activities of the federal government and their effects on the use of private and public land through the nation. The goal of the policy is “To ensure that federal policies and programs and the management of federal lands contribute to the wise use of Canada’s land resources.” The first policy statement asserts: “The federal government will pursue the achievement of the policy goal through a cooperative federal/provincial approach, and will support those provincial land-use objectives,

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				policies and programs that it views to be operating in the national interest." One of ten guidelines of the Federal Policy on Land Use states: "Local, regional and provincial concerns, plans and zoning will be considered, and appropriate action will be taken to ensure that the federal influence on land and local environments has a positive impact."
Land Use and Planning	Territorial Lands Act	Act current to April 2, 2012 Last amended on April 1, 2003	Governor in Council	An Act respecting Crown lands in the Northwest Territories and Nunavut. Subject to Section 6, the Governor in Council may, where the Governor in Council deems it necessary for the protection of the ecological balance or physical characteristics of any area in the Northwest Territories or Nunavut, set apart and appropriate any territorial lands in that area as a land management zone.
Noise	Noise Regulations	Various	Federal government	The federal government sets standards for noise emission labelling and maximum sound emissions for consumer products (e.g., limits for noisy toys, under the Hazardous Products Act), as well as for equipment and vehicles. For example, the Motor Vehicle Safety Act & regulations mandate maximum exterior sound levels for vehicles, as well as interior sound levels for certain large trucks and buses.

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Affected Resource	Law/Regulation	Adoption Date/Current To	Responsible Agency	Summary
				The Canada Labour Code regulates occupational noise in federally regulated workplaces. Every employer must ensure that levels of sound and vibration are in accordance with prescribed standards. For example, the Aviation Occupational Safety and Health Regulations and the Oil and Gas Occupational Safety and Health Regulations under the Code set maximum sound levels to which workers can be exposed during a 24-hour period. Health Canada's Acoustics Division promotes reduction of the health effects of noise exposure and provides and implements standards to protect against occupational and environmental noise, among other things. As well, Health Canada is required to advise on the health effects of environmental noise to environmental assessments involving other federal departments. For example, in 1989, Health Canada commented on the health aspects of noise that would be associated with the construction of additional runways at Toronto's Pearson Airport. Health Canada spearheaded development of the (voluntary) Canadian Standards Association's standard Noise Emission Declarations for Machinery. These declarations appear in instructions, technical sales literature and labels

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				and also assist employers in decisions to purchase quieter machines, implement noise control plans and comply with occupational and environmental noise regulations.
Noise	Occupational Exposure Limits in Canada	July 4, 2011	Canadian Centre for Occupational Health and Safety	The Canadian Centre for Occupational Health and Safety (CCOHS) promotes the total well-being - physical, psychosocial and mental health - of working Canadians by providing information, training, education, management systems and solutions that support health, safety and wellness programs. A not-for-profit federal department corporation, CCOHS is governed by a tripartite Council - representing government, employers and labour - to ensure a balanced, approach to workplace health and safety issues. Occupational exposure limits (OELs) for noise are typically given as the maximum duration of exposure permitted for various noise levels. They are often displayed in exposure-duration tables.
Employment, Population, and Housing	Addressed within other laws and regulations.			
Public Services	Addressed within other laws and regulations.			
Recreation	Parks Canada Agency Act	1998	Minister of the Environment	This Act established the Parks Canada Agency (PCA) for the purpose of ensuring that Canada's national parks, national historic sites and related

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Affected Resource	Law/Regulation	Adoption Date/Current To	Responsible Agency	Summary
				heritage areas are protected and presented for this and future generations and in order to further the achievement of the national interest as it relates to those parks, sites and heritage areas and related programs.
Recreation	Canada National Parks Act	1930	Minister of the Environment	This Act, first established in 1930 and amended in 1988, provides the legislation for National Parks in Canada. Previous to 1930 each National Park had been established by individual Acts. The management of such a park was then subject to the stipulations outlined in the establishing legislation. After 1930 the National Parks Act provided an organic set of rules for the operation of every National Park. New park establishment then became simply a designation of the park's boundaries. The purpose statement is as follows: "The National Parks of Canada are hereby dedicated to the people of Canada for their benefit, education and enjoyment. . and shall be maintained and made use of so as to leave them unimpaired for the enjoyment of future generations."
Recreation	Canada National Marine Conservation Areas Act	2002	Minister responsible for the Parks Canada Agency	This Act establishes marine conservation areas for the purpose of protecting and conserving representative marine areas for the benefit, education and enjoyment of the people of Canada and the world. Marine conservation

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				areas shall be managed and used in a sustainable manner that meets the needs of present and future generations without compromising the structure and function of the ecosystems, including the submerged lands and water column, with which they are associated. The Governor in Council may make regulations, consistent with international law, for the control and management of any or all Marine Conservation Areas, including regulations for the protection of ecosystems and elements of ecosystems, and for the management and control of renewable resource harvesting activities.
Recreation	Fishing and Recreational Harbours Act	1985	Governor in Council	The use, management and maintenance of every scheduled harbour, the enforcement of regulations relating thereto and the collection of charges for the use of every scheduled harbour are under the control and administration of the Minister. The Governor in Council may make regulations (a) prescribing schedules naming and delimiting or describing the fishing or recreational harbours or portions thereof belonging to Her Majesty in right of Canada that are under the control and administration of the Minister for the purposes of this Act;

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				(b) for the maintenance of order and the safety of persons and property at any scheduled harbour; (c) not inconsistent with any other Act of Parliament or regulations made thereunder, for the control of mooring, berthing, loading and discharging of vessels at any scheduled harbour; (d) not inconsistent with any other Act of Parliament or regulations made thereunder, for the control of pollution at any scheduled harbour; (e) prescribing standards for the accommodation and services provided or to be provided at any scheduled harbour; (f) prescribing charges for the use of any scheduled harbour; (g) prescribing the duties or functions of persons appointed or designated under this Act or any other Act of Parliament to supervise or manage any fishing or recreational harbour to which this Act applies; (h) governing inquiries into accidents and incidents held under Section 26; (i) prescribing terms and conditions of agreements entered into pursuant to Subsection 5(2) or (3); (j) prescribing the manner of undertaking economic or other studies pursuant to Subsection 5(4);

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				(k) prescribing terms and conditions of leases, licenses and agreements entered into or granted pursuant to Section 8; (l) prescribing the form of the tickets that may be issued pursuant to paragraph 25(1)(a); (m) respecting the detention and safe-keeping of vessels and goods seized under this Act and the payment of any reasonable costs incidental thereto; (n) prescribing the manner of disposing of anything forfeited under this Act; and (o) generally for carrying out the purposes and provisions of this Act.

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Affected Resource	Law/Regulation	Adoption Date/Current To	Responsible Agency	Summary
Transportation and Traffic	Canada Transportation Act	1996	Transport Canada	An Act to continue the National Transportation Agency as the Canadian Transportation Agency, to consolidate and revise the National Transportation Act, 1987 and the Railway Act and to amend or repeal other Acts as a consequence.
Utilities and Service Systems		April 1976	Canada's Energy and Utility Regulators (CAMPUT)	CAMPUT is a self-supporting, non-profit organization of federal, provincial, and territorial boards and commissions which are responsible for the regulation of the electric, water, gas, and pipeline utilities in Canada. Some CAMPUT members are also responsible for the regulation of matters such as automobile insurance.
Utilities and Service Systems	Regulate pipelines, energy development and trade		National Energy Board (NEB)	NEB is an independent federal agency established in 1959 by the Parliament of Canada to regulate international and interprovincial aspects of the oil, gas and electric utility industries. The purpose of the NEB is to regulate pipelines, energy development and trade in the Canadian public interest. These principles guide NEB staff to carry out and interpret the organization's regulatory responsibilities. The NEB is accountable to Parliament through the Minister of Natural Resources Canada.

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Utilities and Service Systems	Nuclear Safety and Control Act	May 31, 2000 Act current to April 2, 2012 Last amended on July 12, 2010	Canadian Nuclear Safety Commission (CNSC)	The Nuclear Safety and Control Act (NSCA) of Canada replaced the Atomic Energy Control Act of 1946 with new, more effective and explicit legislation to regulate the activities of the Canadian nuclear industry. The NSCA also provided for the establishment of the Canadian Nuclear Safety Commission (CNSC), which replaced the Atomic Energy Control Board (AECB).
Utilities and Service Systems	Nuclear Liability Act	Act current to April 2, 2012		Allows the federal government to cap the liability of a nuclear plant operator at $75 million.
Antarctic Environment	Antarctic Environmental Protection Act (AEPA)	October 20, 2003	Environment Canada	The purpose of the AEPA is to protect the Antarctic environment by implementing the Protocol on Environmental Protection to the Antarctic Treaty. The AEPA provides the legislative basis that Canada requires to oversee Canadian activities in the Antarctic and otherwise fulfill the Madrid Protocol's obligations.
Antarctic Environment	Arctic Waters Pollution Prevention Act	Act current to March 20, 2012 Last amended on January 2, 2010		An Act to prevent pollution of areas of the arctic waters adjacent to the mainland and islands of the Canadian arctic.

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Affected Resource	Law/Regulation	Adoption Date/Current to	Responsible Agency	Summary
All	Environment Protection Act	1990	Ministry of the Environment	Ontario's Environmental Protection Act provides authority to the Ministry of the Environment to (a) investigate problems of pollution, waste management, waste disposal, litter management and litter disposal; (b) conduct research related to contaminants, pollution, waste management, waste disposal, litter management and litter disposal; (c) conduct studies of the quality of the natural environment, meteorological studies, and monitoring programs; (d) conduct studies of environmental planning designed to lead to the wise use of the natural environment; (e) convene conferences and conduct seminars and educational and training programs relating to contaminants, pollution, waste and litter; (f) gather, publish and disseminate information relating to contaminants, pollution, waste and litter; (g) make grants and loans in such amounts and upon such terms as the Ministry considers advisable for, (i) research and training in relation to contaminants, pollution, waste, litter and the

Table A2-18: Summary of Ontario Environmental Laws and Regulations

Affected Resource	Law/Regulation	Adoption Date/Current to	Responsible Agency	Summary
				reduction of waste and the reuse and recycling of materials that are or could become waste, (ii) planning, operating, developing, improving and enlarging waste management systems, waste disposal sites and programs to encourage the reduction of waste or the reuse or recycling of materials that are or could become waste, and (iii) discontinuing waste management systems or reduction, reuse or recycling programs or closing waste disposal sites; (h) establish and operate demonstration and experimental sewage systems under Part VIII, waste management systems, waste disposal sites and programs concerning the reduction of waste or the reuse or recycling of materials that are or could become waste; (i) appoint committees to perform such advisory functions as the Ministry considers advisable; (j) with the approval of the Lieutenant Governor in Council, enter into an agreement with any government or person relating to the protection or conservation of the natural environment; (k) establish and operate, use, alter, enlarge and extend waste management systems or waste disposal sites; and

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Affected Resource	Law/Regulation	Adoption Date/Current to	Responsible Agency	Summary
				(l) discontinue systems and close sites that meet specified criteria.
All	Environmental Assessment Act	1990	Ministry of the Environment	Ontario's Environmental Assessment Act requires that Topics addressed within an environmental assessment may include: 1. Identification of alternatives. 2. Collection of data (criteria/indicators/data sources). 3. Evaluation of alternatives (potential effects, impact management, net effects, advantages/disadvantages). 4. Identification of preferred alternative (one or more could be selected). Specific provincial rules are provided for transit projects, waste management projects, electricity projects, and private sector development. Environmental assessments are subject to review by government experts, Aboriginal communities, the public, and any other interested party.
All	Planning Act	1990	The Minster, the council of a municipality, a local	The purposes of the Planning Act, are: (a) to promote sustainable economic development in a healthy natural environment

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Affected Resource	Law/Regulation	Adoption Date/Current to	Responsible Agency	Summary
			board, a planning board and the Municipal Board.	within the policy and by the means provided under this Act; (b) to provide for a land use planning system led by provincial policy; (c) to integrate matters of provincial interest in provincial and municipal planning decisions; (d) to provide for planning processes that are fair by making them open, accessible, timely and efficient; (e) to encourage co-operation and co-ordination among various interests; (f) to recognize the decision-making authority and accountability of municipal councils in planning. In carrying out their responsibilities under the Planning Act, responsible agencies have regard to: (a) the protection of ecological systems, including natural areas, features and functions; (b) the protection of the agricultural resources of the Province; (c) the conservation and management of natural resources and the mineral resource base;

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Affected Resource	Law/Regulation	Adoption Date/Current to	Responsible Agency	Summary
				(d) the conservation of features of significant architectural, cultural, historical, archaeological or scientific interest; (e) the supply, efficient use and conservation of energy and water; (f) the adequate provision and efficient use of communication, transportation, sewage and water services and waste management systems; (g) the minimization of waste; (h) the orderly development of safe and healthy communities; (h.1) the accessibility for persons with disabilities to all facilities, services and matters to which this Act applies; (i) the adequate provision and distribution of educational, health, social, cultural and recreational facilities; (j) the adequate provision of a full range of housing, including affordable housing; (k) the adequate provision of employment opportunities; (l) the protection of the financial and economic well-being of the Province and its municipalities;

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Affected Resource	Law/Regulation	Adoption Date/Current to	Responsible Agency	Summary
				(m) the co-ordination of planning activities of public bodies; (n) the resolution of planning conflicts involving public and private interests; (o) the protection of public health and safety; (p) the appropriate location of growth and development; (q) the promotion of development that is designed to be sustainable, to support public transit and to be oriented to pedestrians.
Aesthetic Resources	See regulations that pertain to all resources areas, above, and land use and planning regulations, below	--	--	--
Agricultural and Forest Resources	Farming and Food Production Act	1998	Ministry of Agriculture, Food, and Rural Affairs Board; local municipalities	The Farming and Food Production act was developed to conserve, protect, and encourage the development and improvement of agricultural land for the production of food, fiber, and other agricultural or horticultural products.
Agricultural and Forest Resources	Nutrient Management Act of 2002	2002	Provincial officers, and responsible Ministries	The purpose of this Act is to provide for the management of materials containing nutrients in ways that will enhance protection of the natural

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Affected Resource	Law/Regulation	Adoption Date/Current to	Responsible Agency	Summary
				environment and provide a sustainable future for agricultural operations and rural development.
Agricultural and Forest Resources	Forestry Act	1990	Ministry of Natural Resources and Wildlife, local municipalities	The Forestry Act allows the Ministry of Natural Resources and Wildlife to enter agreements with land owners of forest lands for the reforestation of portions of land, the entry and planting of trees upon such portions by the employees or agents of the council, and the fencing of the portions and conservation of all growing trees within the subject land. In addition, the Forestry act allow the Ministry of Natural Resources to establish programs to protect, manage, or establish woodlands and to encourage forestry that is consistent with good forestry practices.
Air Quality	See regulations that pertain to all resources areas, above.	--	--	--
Biological Resources	See regulations that pertain to all resources areas and agricultural and forestry resources, above, and land use and planning regulations, below	--	--	--

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Biological Resources	Provincial Parks and Conservation Reserves Act	2006	Ministry of Natural Resources and other members of the Executive Council	The purpose of the Provincial Parks and Conservation Reserves Act is to permanently protect a system of provincial parks and conservation reserves that includes ecosystems that are representative of all of Ontario's natural regions, protects provincially significant elements of Ontario's natural and cultural heritage, maintains biodiversity and provides opportunities for compatible, ecologically sustainable recreation.
Cultural Resources	Section 35 of the Constitution Act	1982	Ministry of Aboriginal Affairs and Aboriginal Affairs and Northern Development Canada.	Section 35 of the Constitution Act, 1982, requires that consultation with Aboriginal communities at the environmental assessment stage. Guidance related to consultation, include consideration of: The nature, scope, and content of the duty to consult and accommodate varies with the circumstances. Meaningful consultation requires the Crown (Ontario Government) to listen with an open mind to what the Aboriginal communities have to say. There may be a requirement to makes changes to a proposal based on information obtained through consultations. Accommodation requires a process of balancing interests.

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Affected Resource	Law/Regulation	Adoption Date/Current to	Responsible Agency	Summary
				Responsiveness is a key element of both consultation and accommodation.
Energy Demand	Ontario Energy Board Act	1998	Ontario Energy Board	The Ontario Energy Board Act is guided by the following objectives: 1. To protect the interests of consumers with respect to prices and the adequacy, reliability and quality of electricity service. 2. To promote the education of consumers. 3. To promote economic efficiency and cost effectiveness in the generation, transmission, distribution, sale and demand management of electricity and to facilitate the maintenance of a financially viable electricity industry. 4. To promote electricity conservation and demand management in a manner consistent with the policies of the Government of Ontario, including having regard to the consumer's economic circumstances. 5. To facilitate the implementation of a smart grid in Ontario. 6. To promote the use and generation of electricity from renewable energy sources in a manner consistent with the policies of the Government of Ontario, including the timely expansion or reinforcement of transmission

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Affected Resource	Law/Regulation	Adoption Date/Current to	Responsible Agency	Summary
				systems and distribution systems to accommodate the connection of renewable energy generation facilities. The Ontario Energy Board Act provided regulations for gas (storage, transmission, facilities), electricity (license conditions, generation, transmission), and transmission and distribution lines.
Geology, Soils, and Mineral Resources	Aggregate Resources Act	1990	Ministry of Natural Resources and Ministry of Northern Development, Mines and Forestry	The Aggregate Resources act provides for the management of the aggregate resources of Ontario, regulates aggregate operations, requires the rehabilitation of land from which aggregate has been excavated, and minimizes adverse impacts on the environment in respect of aggregate operations.
Geology, Soils, and Mineral Resources	Mining Act	1990	Ministry of Natural Resources and Ministry of Northern Development, Mines and Forestry	The Mining Act regulates mining claims, oil, gas, underground storage and salt solution mining, surface mining of non-metallic minerals, rehabilitation of mining lands, and tax requirements for mining operations.
Greenhouse Gases	Climate Change Mitigation and Low-carbon Economy Act	2016	Ministry of the Environment and Climate Change or relevant members of the Executive Council	The Climate Change Mitigation and Low-Carbon Economy Act is intended to reduce greenhouse gas emissions, transition Ontario to a low-carbon economy, and enable Ontario to collaborate and coordinate its actions with similar actions in other jurisdictions in order to ensure the efficacy of its

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Affected Resource	Law/Regulation	Adoption Date/Current to	Responsible Agency	Summary
				regulatory scheme in the context of a broader international effort to respond to climate change. This act establishes greenhouse gas emission reduction targets to be reduced by 15 percent by 2020, 37 percent by 2030, and 80 percent by 2050, compared to 1990 levels. It requires preparation of climate change action plan that sets out actions under a regulatory scheme designed to modify behavior that will enable Ontario to achieve its targets for the reduction of greenhouse gas emissions. The Climate Change Mitigation and Low-Carbon Economy Act also contains the Cap and Trade Program, addressing accounts and transactions, emission allowances and credits, verification, inspection, and investigation, and enforcement.
Greenhouse Gases	Green Energy Act	2009	Ministry of Energy or relevant members of the Executive Council	The Ontario Green Energy Act, formally the Green Energy and Green Economy Act, 2009, introduced in the Ontario legislature on February 23, 2009, is intended to expand renewable energy production, encourage energy conservation and create green jobs. This act creates a number of feed-in tariff (FIT) rates for different types of energy sources. Notable among these is the microFIT (renewable energy microgenereation) program for small non-commercial systems under 10 kilowatts, and FIT, the larger commercial version which covers a

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Affected Resource	Law/Regulation	Adoption Date/Current to	Responsible Agency	Summary
				number of project types with sizes into the megawatts.
Hazards and Hazardous Materials	Pesticides Act	1990	Ministry of the Environment	The Pesticides Act allows the Ministry of the Environment to: investigate problems relating to pesticides and the control of pests; conduct research relating to pesticides and the control of pests; conduct studies of the effect of pesticides and the control of pests on the quality of the environment; convene conferences and conduct seminars and educational programs relating to pesticides and the control of pests; gather, publish and disseminate information relating to pesticides and the control of pests; make grants and loans for research related to pesticides and the control of pests in such amounts and upon such terms and conditions as the regulations may prescribe; appoint committees to perform such advisory functions as the Ministry considers requisite; and, with the approval of the Lieutenant Governor in Council, enter into an agreement with any government or person relating to pesticides or the control of pests.
Hazards and Hazardous Materials	The Technical Standards and Safety Act	2000	Relevant Ministry	The Technical Standards and Safety Act regulates, among other things, fuel storage tanks, both aboveground and underground. Its provisions require that where an aboveground or underground storage system is removed permanently, an assessment must be completed

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Affected Resource	Law/Regulation	Adoption Date/Current to	Responsible Agency	Summary
				delineating the full extent of any petroleum product that has escaped to the environment
Hazards and Hazardous Materials	Occupational Health and Safety Act	1990	Ministry of Labour	The Occupational Health and Safety Act contains provisions that deal with the handling of hazardous materials in the workplace, for example: asbestos. It also mandates the Workplace Hazardous Materials Information System (WHIMIS) and the requirements for material safety data sheets (MSDSs).
Hazards and Hazardous Materials	The Dangerous Goods Transportation Act	1990	Ministry of Transportation	The Dangerous Goods Transportation Act mirrors the federal act, and imports the provisions of the federal act into Ontario for purposes of the transportation of good by provincially-regulated transportation entities.
Hazards and Hazardous Materials	Fire Protection and Prevention Act	1997	Executive Council Members	The Fire Protection and Prevention Act require municipalities to establish a program in the municipality which must include public education with respect to fire safety and certain components of fire prevention; and provide such other fire protection services as it determines may be necessary in accordance with its needs and circumstances.
Hydrology and Water Quality	Drainage Act	1990	Local municipalities	The Drainage Act provides a procedure whereby the municipality may, with a valid petition of landowners in the “area requiring drainage,” provide a legal outlet for surface and subsurface waters not attainable under common law. In

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Affected Resource	Law/Regulation	Adoption Date/Current to	Responsible Agency	Summary
				return, the landowners within the defined drainage watershed pay for the privilege of the drainage outlet. Future maintenance costs are covered as part of the drainage report. Under the Drainage Act, the municipality is responsible for maintaining the drainage works after construction. The municipality may appoint a drainage superintendent to supervise maintenance work on all municipal drains within the municipality. When the drainage report is "current," maintenance work can be undertaken without preparing a new drainage report. The drainage superintendent is responsible to the municipality and the landowners for inspecting the drain or local problems on the drain, discussing necessary maintenance with landowners, and supervising the maintenance work. The costs for maintenance are distributed amongst the landowners in the watershed according to the maintenance clauses contained in the current report.
Hydrology and Water Quality	The Ontario Water Resources Act	1990	Ontario Clean Water Agency	The purpose of the Ontario Water Resources Act is to provide for the conservation, protection, and management of Ontario's waters and for their efficient and sustainable use, in order to promote Ontario's long-term environmental, social, and economic well-being. The act contains provisions that regulate the discharge of sewage and

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Affected Resource	Law/Regulation	Adoption Date/Current to	Responsible Agency	Summary
				definitions of water basins (Great Lakes – St. Lawrence River Basin, Nelson Basin, and Hudson Bay Basin).
Land Use and Planning	See regulations that pertain to all resources areas, above.	--	--	--
Land Use and Planning	Provincial Policy Statement	2015	The Minster, the council of a municipality, a local board, a planning board and the Municipal Board.	The Provincial Policy Statement provides policy direction on matters of provincial interest related to land use planning and development. As a key part of Ontario's policy-led planning system, the Provincial Policy Statement sets the policy foundation for regulating the development and use of land. It also supports the provincial goal to enhance the quality of life for all Ontarians
Land Use and Planning	Development Charges Act	1997	The Minster, the council of a municipality, a local board, a planning board and the Municipal Board.	The Development Charges Act allows the council of a municipality to impose development charges against land to pay for increased capital costs required because of increased needs for services arising from development of an area.
Land Use and Planning	Smart Growth for Our Communities Act	2015	The Minster, the council of a municipality, a local board, a planning board and the Municipal Board.	The Smart Growth for Our Communities Act, 2015 (Bill 73) received Royal Assent on December 3, 2015. The Act makes changes to both the Development Charges Act and Planning Act to:

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Affected Resource	Law/Regulation	Adoption Date/Current to	Responsible Agency	Summary
				Help municipalities fund growth Give residents a greater, more meaningful say in how their communities grow Protect and promote greenspaces Make the development charges system more predictable, transparent and accountable Make the planning and appeals process more predictable Give municipalities more independence and make it easier to resolve disputes
Land Use and Planning	Greenbelt Plan	2015	Greenbelt Advisory Panel	The Growth Plan for the Greater Golden Horseshoe, the Greenbelt Plan, the Oak Ridges Moraine Conservation Plan and the Niagara Escarpment Plan are four provincial land use plans that work together to manage growth, build complete communities, curb sprawl and protect the natural environment. These plans support agriculture and promote economic development in Ontario's Greater Golden Horseshoe. As Canada's largest economic engine, the Greater Golden Horseshoe is also one of the fastest growing regions in North America. It contains some of Canada's best farmland, valuable water resources, and world-renowned natural features like the Niagara Escarpment.

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Affected Resource	Law/Regulation	Adoption Date/Current to	Responsible Agency	Summary
Noise	See regulations that pertain to all resources areas, above.	--	--	--
Employment, Population and Housing	Housing Services Act	2011	Ministry of Municipal Affairs and Housing or such other member of the Executive Council	The Housing Services Act requires that service managers prepare a plant to address housing and homelessness that includes: an assessment of current and future housing needs within the service manager's service area; objectives and targets relating to housing needs; a description of the measures proposed to meet the objectives and targets; a description of how progress towards meeting the objective and targets will be measured; and such other matters as may be prescribed
Public Services	Fire Protection and Prevention Act	1997	Executive Council Members	The Fire Protection and Prevention Act require municipalities to establish a program in the municipality which must include public education with respect to fire safety and certain components of fire prevention; and provide such other fire protection services as it determines may be necessary in accordance with its needs and circumstances.
Recreation	Provincial Parks and Conservation Reserves Act	2006	Ministry of Natural Resources and other members of	The purpose of the Provincial Parks and Conservation Reserves Act is to permanently protect a system of provincial parks and conservation reserves that includes ecosystems

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Affected Resource	Law/Regulation	Adoption Date/Current to	Responsible Agency	Summary
			the Executive Council	that are representative of all of Ontario's natural regions, protects provincially significant elements of Ontario's natural and cultural heritage, maintains biodiversity and provides opportunities for compatible, ecologically sustainable recreation.
Transportation and Traffic	Highway Traffic Act	1990	Ministry of Transport	The Highway Traffic Act established the Registrar of Motor Vehicles, which has general supervision over all matters relating to highway traffic within Ontario. This includes permits, license, parking, equipment requirements (e.g., mirrors, tires, noise, smoke, horns), speed limits, and rules of the road.
Utilities and Service Systems	The Clean Water Act The Nutrient Management Act The Safe Drinking Water Act	2006 2002 2002	Ministry of Natural Resources and other members of the Executive Council	These three Acts arise out of an incident in which a municipal drinking water system was contaminated through a combination of agricultural run-off and poor training and management by municipal officials. The Acts, read together, are an attempt to prevent a recurrence of that kind of incident, through a combination of measures. The Clean Water Act, 2006, is intended to protect sources of drinking water. It requires designated areas, principally municipalities, to prepare source protection plans, which are measures to identify and protect local drinking water sources.

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Affected Resource	Law/Regulation	Adoption Date/Current to	Responsible Agency	Summary
				The Nutrient Management Act, 2002, regulates the use of materials, chiefly associated with large scale or intensive agricultural and livestock operations, which may adversely affect the environment. The Safe Drinking Water Act, 2002, regulates drinking water systems. It establishes standards for those who own and operate a drinking water system, in most cases, municipal governments. It imposes requirements on those who operate the systems and on those who test the systems.
Utilities and Service Systems	Ontario Water Resources Act	1990	Ontario Water Resources Agency	The Ontario Water Resources Act contains requirements for water rights, construction of wells, and approval of sewage works.
Utilities and Service Systems	See Energy Demand Above	--	--	--
Utilities and Services Systems	Resource Recovery and Circular Economy Act	2016	Ministry of the Environment and Climate Change	The Resource Recovery and Circular Economy Act directs the Ministry of the Environment and Climate Change to develop the Strategy for a Waste-Free Ontario. The purpose of the strategy is to: (a) protect the natural environment and human health; (b) foster the continued growth and development of the circular economy;

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Affected Resource	Law/Regulation	Adoption Date/Current to	Responsible Agency	Summary
				(c) minimize greenhouse gas emissions resulting from resource recovery activities and waste reduction activities; (d) minimize the generation of waste, including waste from products and packaging; (e) increase the durability, reusability and recyclability of products and packaging; (f) hold persons who are most responsible for the design of products and packaging responsible for the products and packaging at the end of life; (g) decrease hazardous and toxic substances in products and packaging; (h) minimize the need for waste disposal; (i) minimize the environmental impacts that result from resource recovery activities and waste reduction activities, including from waste disposal; (j) provide efficient, effective, convenient and reliable services related to resource recovery and waste reduction, including waste management services; (k) increase the reuse and recycling of waste across all sectors of the economy;

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Affected Resource	Law/Regulation	Adoption Date/Current to	Responsible Agency	Summary
				(l) increase opportunities and markets for recovered resources; (m) promote public education and awareness with respect to resource recovery and waste reduction; (n) promote cooperation and coordination among various persons and entities involved in resource recovery activities and waste reduction activities; (o) promote competition in the provision of resource recovery services and waste reduction services; (p) foster fairness for consumers; (q) do any other related thing that may be prescribed.

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ATTACHMENT B: SUMMARY OF IMPACTS

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Resource Areas and Impact Categories	Significance Determination
Aesthetics	
Construction-Related Impacts	PSU
Operational Impacts	PSU
Agriculture and Forest Resources	
Construction-Related Impacts	PSU
Operational Impacts	PSU
Air Quality	
Construction-Related Impacts	PSU
Operational Impacts	LTS
Construction-Related and Operational Odors Impacts	PSU
Biological Resources	
Construction-Related Impacts	PSU
Operational Impacts	PSU
Cultural Resources	
Construction-Related and Operational Impacts	PSU
Energy Demand	
Construction-Related Impacts	LTS
Operational Impacts	B
Geology and Soils	
Construction-Related Impacts	PSU
Operational Impacts	PSU
Greenhouse Gas	
Construction-Related and Operational Impacts	B
Hazards and Hazardous Materials	
Construction-Related Impacts	PSU
Operational Impacts	PSU
Hydrology and Water Quality	
Construction-Related Impacts	PSU
Operational Impacts	PSU
Land Use Planning	
Construction-Related Impacts	LTS
Operational Impacts	PSU

Resource Areas and Impact Categories	Significance Determination
Mineral Resources	
Construction-Related Impacts	LTS
Operational Impacts	LTS
Noise	
Construction-Related Impacts	PSU
Operational Impacts	PSU
Population and Housing	
Construction-Related Impacts	LTS
Operational Impacts	LTS
Public Services	
Construction-Related Impacts	LTS
Operational Impacts	LTS
Recreation	
Construction-Related Impacts	LTS
Operational Impacts	PSU
Transportation/Traffic	
Construction-Related Impacts	PSU
Operational Impacts	PSU
Utilities and Service Systems	
Operational Impacts	PSU
Notes: B = Beneficial; LTS = Less-Than-Significant; NA = Not Applicable; PSU = Potentially Significant and Unavoidable	